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ABSTRACT

A study was conducted to construct and validate an instrument designed to measure both women students' attitudes toward industrial education and the status of certain factors that may have an impact on those attitudes. The resulting instrument was a Likert response-based survey that was directly administered in one middle school and five high schools throughout Wisconsin. A total of nearly 600 students participated. Significant differences were found when the mean survey scores of male students were compared with the mean survey scores of female students for both the attitude portion of the survey and the total survey score. Such significant differences were not found in the impact portion of the survey. Students from schools with compulsory and genuinely open women's industrial education enrollment and innovative programs tended to score significantly higher on the attitude survey and were more positive toward industrial education than were women in schools with traditional and conservative industrial education programs A similarly significant difference was found for impact and whole survey scores. Significant correlations between the impact and attitude portions of the test were detected. Some responses were noted to vary widely on the basis of the sex and/or the respective school of the groups of respondent students. (Samples of the survey and the survey manual are appended.) (LRA)

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ED183944

FINAL REPORT

WOMEN'S ATTITUDES TOWARD INDUSTRIAL EDUCATION

Conducted by

Center for Vocational, Technical and Adult Education
University of Wisconsin-Stout
Menomonie, Wisconsin 54751

Project Director
Peter Cupery

August, 1978

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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Chapter 1

PROBLEM STATEMENT

Summary

Problem. The purpose of this research was to construct and validate an instrument to measure:

(1) women's attitudes toward industrial education, and

(2) the status of certain factors that may influence those attitudes.

Approach. The portion of the instrument devoted to attitude influencing factors was designed to have a sensitivity to factors that may have a strong impact upon the attitude of women students. The selection of specific factors assessed in items concerned with impacts on attitudes was guided by results of a literature search and interviews of middle school, high school, and college women in and outside of the fields generally associated with industrial education related activities. Examples of impacts upon attitudes towards industrial education included parental acceptance and encouragement, peer acceptance, instructor acceptance, and placement/recruitment information. Each of these factors may have positive or negative impacts upon any students' attitudes. Some may be more important than others to a given student. Impacts that were potentially most important to women students were identified and included in the proposed instrument.

The resulting instrument was a Likert response based survey that was directly administered in one middle school and five high schools throughout Wisconsin. A total of nearly 600 students participated. This instrument was constructed and validated for junior, middle and senior high school

students with the assistance of the people and resources of the Center for Vocational, Technical and Adult Education, UW-Stout.

Findings. Significant* differences were found when the mean survey scores of male students were compared with the mean survey scores of female students for both the attitude portion of the survey and the total survey score. Such significant differences were not found in the impact portion of the survey. Students from schools with compulsory and genuinely open women's industrial education enrollment and innovative programs tended to score significantly higher on the attitude survey more positive toward industrial education than schools with traditional and conservative industrial education programs. A similarly significant difference was found for impact and whole survey scores. Significant correlations between the impact and attitude portions of the test were detected. Some responses were noted to vary widely on the basis of the sex and/or the respective school of the groups of respondent students.

Problem

Need. An area of increasing concern to Wisconsin industrial educators at all levels of the educational hierarchy is the low percentage of women enrolled in industrial education courses. Data from the Wisconsin Department of Public Instruction indicates that women constitute about 12.5% of all Wisconsin secondary students enrolled in industrial education curriculum areas during the 1975-76 academic year. Vocational schools, at just over 11%, are quite close to the figure for secondary schools according to figures supplied by the Wisconsin Board of Vocational, Technical and Adult Education. Information supplied by the Registrar and the University

*"Significant" will only be used when significance is at the 0.01 level or better.

Planning Division of the University of Wisconsin-Stout places the levels at 5% for the Industrial Technology area, and just under 2% for industrial education. It must be emphasized that these figures, although well below the 47% to 49% typical for a population in the age groups involved, indicate a solid improvement has taken place in just the last few years.

Two pieces of legislation, the Vocational Education Amendments of 1976 and Title IX Education Amendments of 1972, are intended to counteract or eliminate sex discrimination in education. The Vocational Education Amendments of 1976 place special emphasis on reducing sex bias and sex role stereotyping and are intended to foster active encouragement of women to enter non-traditional vocations. Title IX prohibits sex-based discrimination by institutions of education that receive federal financial assistance. Since deviations from an approximate balance of males and females might be an important criterion measure of the existance of discrimnation, failure to maintain and increase the percentages of women in industrial education could result in uncomfortable relationships between Wisconsin's industrial education community and the Federal government.

A second factor, declining numbers of school age students, may prove to be as strong a mandate as the just mentioned legislation for increased women's participation in non-traditional technical courses. The decline is dramatic. Births in 1974 were about <u>half</u> the number of births in 1964, according to Wisconsin DPI figures (See Table 1 in Appendix C). The class with peak enrollment is in high school now; the graduating class of 1979 will have about 97,000 students. The class of 1989 has 30,000 less students than that. And only three years after 1989, the class of 1992, may have less than 50,000 graduates.

Including women in industrial education programs should help offset the coming losses in total numbers of students. Clearly, the Wisconsin industrial education community needs to explore ways to increase participation of women in non-traditional programs.

It must be recognized that simply allowing women to enroll in industrial education courses may not be enough of a change to bring about the needed balance of women and men students in this area.

The negative forms of the impacts listed toward the end of the summary may be viewed as barriers that keep women from enrolling in industrial education courses. To successfully deal with these barriers, they must first be identified and then the importance of each barrier must be determined.

Once the existence and relative importance of the respective barriers are established, they can either be dealt with directly or with compensating impacts. Non-supportive parents may be involved by alerting them to the advantages and benefits of participating in an industrial education course. If they become supportive as a result of such involvements, their encouragement might be a positive impact that would compensate for and overcome a barrier like peer discouragement.

When objective information has been gathered, decisions involving direct and compensating activities are best made and acted upon by the educators directly involved in a given situation. Often, however, attitudinal data collection is both time consuming and difficult to quantify. The instrument resulting from this proposed research should make such data collection much easier. It will also have the benefit of the validation process built into the research.

The actual use of the instrument is up to the discretion and needs of the individual educator. The attitude measuring portion could be used alone to monitor:

(1) student acceptance of new or continuing programs,

(2) differences of attitudes on a male-female basis or class by class basis; or

(3) changes or attitudes on a year by year basis.

The whole instrument could be used for explorations like those just mentioned, but with the added dimension of having the status of selected impacts available to help guide efforts to involve female students in industrial education curriculums. To these ends, the problem statement is made.

Problem Statement

The purpose of this research was the construction and validity of a Likert scale based instrument designed to measure both women students' attitudes toward industrial education and the status of certain factors that may have an impact on those attitudes.

Objectives

This research was initiated to achieve the following four objectives:

1. Construct a Likert scale based instrument designed to measure women's attitudes toward industrial education and impacts upon those attitudes.
2. Determine the validity and reliability of the instrument.
3. Prepare and print a manual describing appropriate administration practices and interpretation of results for the instrument.
4. Prepare a report on the research involved in constructing and validating the instrument.

Rationale

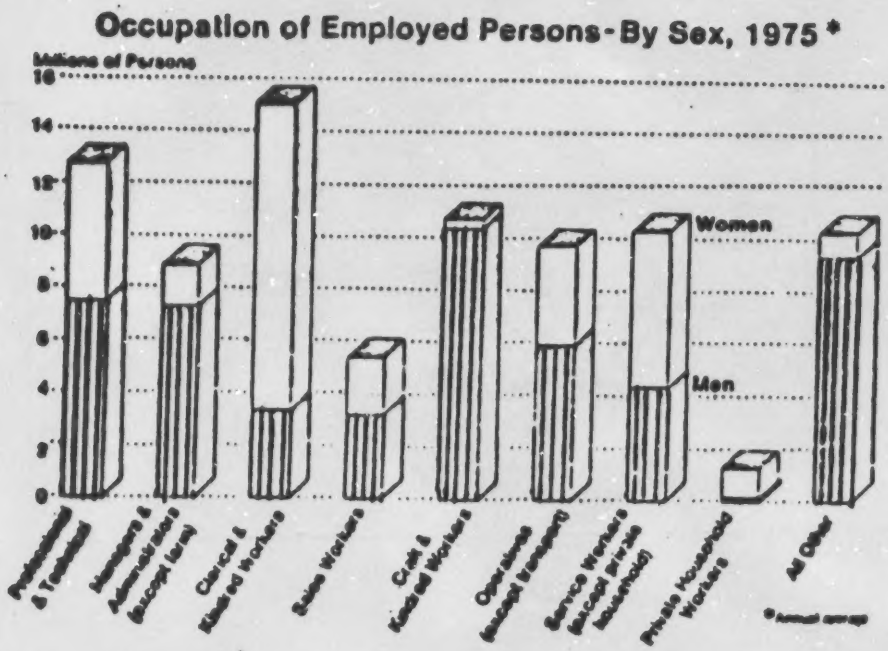
The introduction focused on the legislative and demographic factors that encourage an increase of the percentage of women in industrial education courses in Wisconsin. Those two arguments affect educators directly. A third factor relates more to the student, specifically, to the realities of employment as they are affected by high school industrial education courses.

First, consider the current realities of women in non-traditional fields. On a percentage basis, marked gains have been made in the proportion of women in trade and industry fields. During the period from 1960 to 1970 the number of women in skilled trades increased at a rate about eight times that of the men (Hedges and Bennis, 1974). At UW-Stout there has been a significant increase in the number of women enrolled in industrial education and industrial technology.

As promising as these data appear, however, the participation of women in male intensive occupations is still extremely small. Numerically, the increase in the number of women is small. The relatively small number of women employed in transportation, crafts and non-farm labor jobs is shown in Figure 1. Although some gains have been made during the past year, the proportion of women in these occupations has not changed significantly.

The concentration of women in a small number of occupations was also pointed out by Simpson (1973). She reported that one-fourth of all women workers were employed as secretaries/stenographers, bookkeepers, waitresses, elementary school teachers or household workers. Another one-fourth were employed in sixteen other occupations. Thus, approximately 50% of women workers were employed in 21 of 250 occupations included in the 1969 Bureau of Census data.

Figure 1

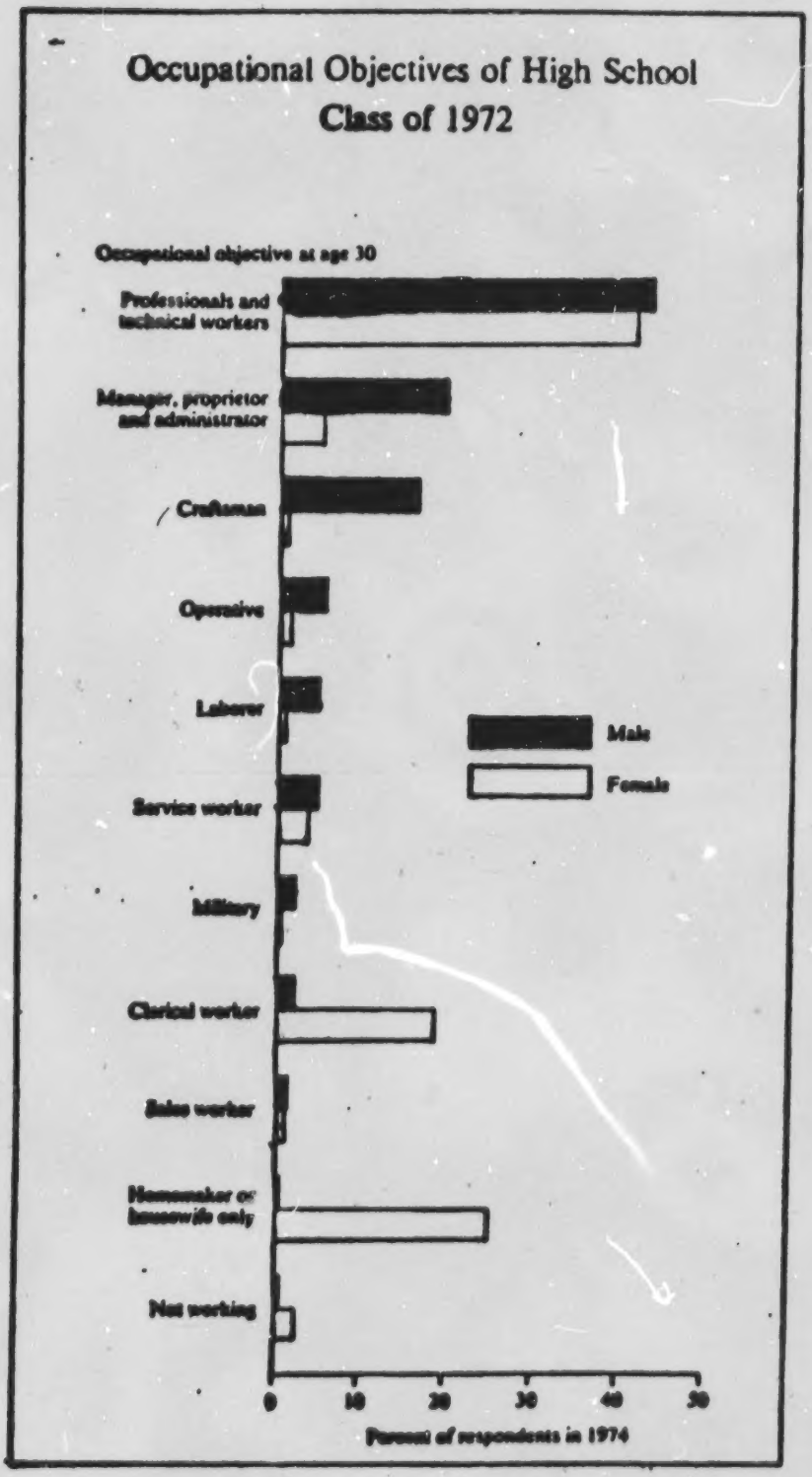


(Road Maps of Industry, 1976b)

One of the reasons that slow progress is being made in increasing the number of women in skilled trades and other traditionally male intensive occupations is the occupational interests of women.

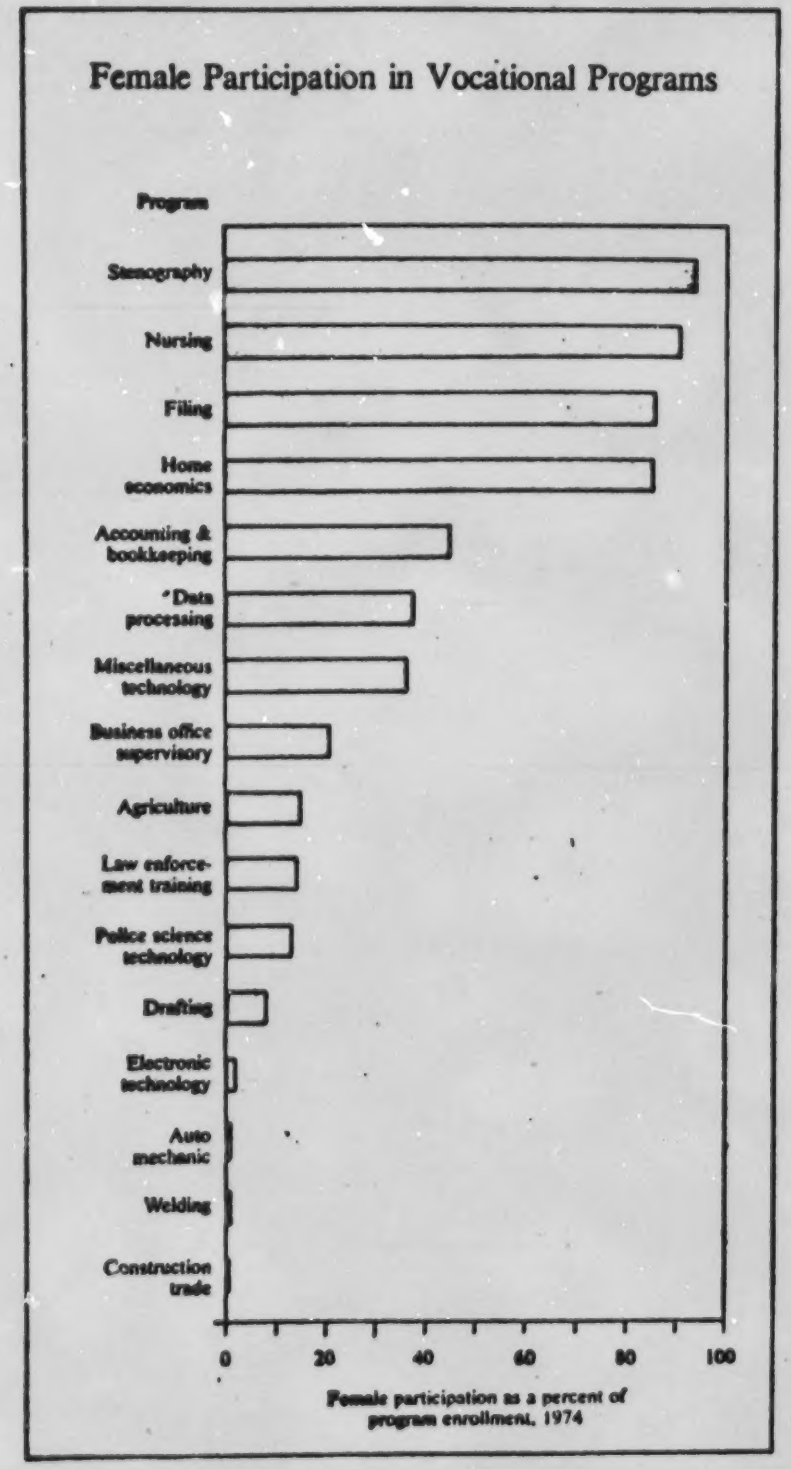
The recently published NIE report, The Condition of Education (1976) reports the occupational objectives of high school seniors (See Figure 2). Very similar proportions of females and males are interested in professional and technical work. However, there are marked differences in aspirations to enter skilled and mechanical trades and management fields. These interests are reflected in the female enrollment patterns in vocational programs. By far, the most popular programs for women are stenography, nursing, filing and home economics (See Figure 3).

Figure 2



(The Condition of Education, 1976)

Figure 3



(The Condition of Education, 1976)

Although there is need for more extensive research on the factors involved in women's career decision-making processes (Bailey and Stadt, 1973), several elements appear to be involved (Roby, 1976). Access to information on male intensive jobs is often limited to women. And, the information available often portrays men carrying out the work activities. When a women seriously considers a male intensive occupation, she frequently is challenged by internalized conception of her career choice and the "proper" role of women. Should she continue with her "non-traditional" career choice, enrollment in an appropriate vocational program may be discouraged by counselors and staff involved with the program. Typically, there are few female models in male intensive occupations either in the role of teacher or employer. Thus, completion of the program must be accomplished by overcoming these barriers.

After graduation, placement may be the major barrier to overcome. Many initial placements in an occupation are made through family and friends. Women lack this network of contacts in male intensive fields.

Until recently women who have successfully entered male intensive occupations have overcome these multiple barriers on an ad hoc basis. Effective processes administered in a systematic way are needed to make equal opportunity available to women.

There is great need to research and develop processes and procedures for providing equal opportunity for women in traditionally male intensive academic and occupational areas. Educators also recognize that years of tradition and long established role concepts suggest that progress will be slow. Angelo Gillie, Sr., editor of the American Vocational Journal, speculates that "hopefully, complete equality will have been achieved for women in vocational education by the year 2000" (Gillie, 1974).

In some ways, the year 2000 may seem remote, but in other ways the year 2000 is closing in. In reference that turn of the century goal of women's equality in vocational education, Grisham (1974) suggests that "we've got to begin to project ahead."

One probable mechanism for facilitating entry of women into both vocational education and non-traditional fields of employment is increasing the number of women in industrial education courses. In a paper surveying the status of women industrial education teachers, Harycki (1977) found that the major perceived barriers to entry of women into their fields was either lack of high school technical preparation or lack of technical experience while growing up - either of these barriers would be reduced by including women in secondary industrial education curricula.

Briggs (1973) notes that less than 2% of the 1973 high school students enrolled in industrial education courses were women. Absence of an industrial education background was felt by Briggs to be a handicap for people taking the tool identification and function tests necessary for entrance into apprentice programs. In a closing statement on recommendations of the three year long Wisconsin based project on women in apprenticeships, Briggs wrote "The project is convinced that the breaking of these attitudinal barriers to women's entry into the skilled trades, whether by apprenticeship or some other means of training, will over the long run be the only effective way of reducing the number of women heads of households who are poor and receiving AFDC."

Breaking attitudes of this nature would benefit many women beside those who are heads of households, but the quote points out that society as well as individuals will be benefitted by increasing the technical background of women during high school and pre high school experience.

The vocational possibilities for women would be improved through such efforts as assessing specific problems, revising practices, developing materials for students and faculty, implementing programs and publicizing success according to recommendations resulting from research for the State of Illinois by Steiger (1974).

The efforts to increase the proportion of women in industrial education courses in Wisconsin are not only mandated by legislation and demograhic trends, but also by the fact that academic experiences of technical nature are probably of real consequence to the financial security of many future women workers. Failure to include meaningful numbers of women in industrial education courses could be damaging to the field, to the depth of technically qualified work force and worst of all, to the future of many women students.

U.S. Department of Labor projections indicate that the future of an increasing number and percentage of women will be in the American Work Force. According to the Department's Bureau of Labor statistics, "Labor force participation among women has been increasing rapidly for many years, and this increase is projected to continue, although at a lower rate through 1990. The number of women in the labor force, 37 million in 1975, is projected to rise by 11.6 million by 1990, an increase of 1.8% per year. This represents a slightly slower rate of growth than experienced over the early 1970's when the female labor force grew 3.2% a year. The main factor behind the projected slowdown is a drop after 1980 in the number of women in the ages at which people enter the labor force ..."

In that same period, the number of men in the labor force will grow at a lower rate both in numbers, 9.6 million, and in percentages, 1.1%. In spite of this lower growth rate, men will still be 57% of the U.S. work force.

Women are expected to comprise about one half of the total labor force growth between now and 1990. They will be an important factor in the growth of the "Prime Age Labor Force" - workers with an age from 25 to 54. This section of the work force is expected to expand at a 2.1% rate until 1980, 2.4% during the early 1980's, and 2.1% to 1990. Comprising 61% of the work force in 1975, the prime age labor force group should grow to 65% in 1985 and to about 70% by 1990.

The conditions just presented are important to women students, again according to the Bureau of Labor Statistics. Because of the "crowding" of workers in these central age groups, the individual members of these groups are likely to encounter more competition for certain jobs, such as management positions, the number of which are generally related to the number of workers of all ages. Both men and women will need to be well prepared to enter such a work force successfully for many of those men and women, exposure to industrial education courses should be an intrinsic element of that preparation. Industrial education is in general for men, but in many areas, women are recent participants.

The proposed attitude and impact measuring instrument is intended as a facilitator for educators involved in monitoring acceptance of ongoing or new programs to women students. Actually, the attitude portion will probably apply to male and female students alike; the impact portion is the women sensitive portion of the tool. A fuller discussion of the instrument follows in the section titled "Instrumentation."

Definition of Terms

Attitude: This term has many definitions and as such is not well defined. For this research, consider the attitude to be the status, positive, neutral or negative of a student's disposition toward industrial education.

Industrial Education: This is the informal definition that was appended to each survey:

Industrial Education, or I.E., deals with learning how to make or fix things and how industry makes or fixes things. In many schools, I.E. is known as "industrial arts" or "shop." The subjects taught by I.E. teachers include woodworking, electronics, leatherwork and other crafts, auto repair, printing, metalworking, house construction, and general courses that cover several areas on a beginning level.

Traditional: Refers to programs that offer specific courses such as woods, metals, power and/or auto mechanics, drafting, and electricity. These programs tend to have rigid course entry and sequence formats and are highly skill oriented.

Innovative: Refers to programs that approach industrial education initially on a broad conceptual basis and in successive courses that become more specific. An initial course might look at industry as a whole. A second course might involve the materials and processes aspect of industry followed by a specific course - plastics as a division of materials and processes, for instance. Often these courses include cooperative enterprise type projects. Also, innovative programs usually are open to, and sometimes compulsary for both male and female students, at least on the introductory level.

Chapter II

METHODS AND PROCEDURES

Design

School Selection. The six schools in the sample were selected with the help of a Wisconsin Department of Public Instruction Industrial Education Consultant.

An effort was made to make the school selection on a state-wide basis. Each was located in a different county. The two closest schools are about 20 miles apart. The most distant are about 290 miles from each other.

School enrollment was one of the two main factors used in selection. Two of the schools had enrollments of under 500 for grades 9-12. Two had enrollments of about 1000 for grades 9-12 for one and grades 7-9 for the other. One of the two largest schools had an enrollment of about 1500 for grades 7-12, the other about 2000 for grades 9-12.

The other factor used in selecting schools was the status of each program of industrial education on a spectrum from very traditional to very innovative. One school was considered traditional, three were in the middle of the spectrum, and two were considered quite innovative.

Each of the six schools had (and has) a strong program and a highly cooperative staff and administration. Many other characteristics of the respective schools vary, but at this point, the data seem to reflect the nature of the program rather than school size, community size, location or other factors that were included in the research design.

Population Sample. The population is that of Wisconsin students enrolled in seventh through twelfth grades. As mentioned earlier, five high schools and one middle school were selected. The ideal sample from each school would have been a random selection of 100 students. Given the constraints of limited time and a desire to keep a harmonious relationship with cooperating teachers and administrators, more general parameters were set. An overall level of 40% was set as the minimum acceptable proportion of women for the total population. At each school the minimum was set at 35% women and 60 to 130 students total.

Beyond that self imposed constraints were minimal to give maximum flexibility at each school. Within each school, two patterns of selection were followed.

The first pattern was class by class selection. Administrators from four schools followed that pattern by providing access to a series of industrial education classes; and, if balance was needed to attain a 35% minimum of women students, some home economics classes were also included.

The second pattern was providing access to a series of study halls until the 60 students, 35% female minimums were met. These sampling variations may or may not have affected the results. It must be emphasized at this point that this is a developmental pilot study. Such variations of sample selection as described here would have to be replaced with a more tightly controlled and well defined sampling procedure for a study with different goals.

Instrumentation

Developmental Process. Two stages of development have been completed. The first survey of Women's Attitudes Towards Industrial Education was headed with the abbreviation, W.A.T. - I.E. Initial Survey (See Appendix A, Part 1). This survey was basically an information gathering device. It was administered to women in a Wisconsin middle school, two high schools and two colleges. A total of about 100 students completed this instrument. Most attention was paid to three orally delivered questions given at the end of the survey.

The oral questions asked what encouraged or caused likes and dislikes relative to industrial education and what, if any, problems they encountered in enrolling in industrial education courses. Often a discussion and note taking session with the students followed the survey.

The next survey was entitled W.A.T. - I.E. Second Survey (See Appendix A, Part 2). The items in this Likert scale based instrument were derived from other surveys, results of research by Harycki and Thingvold at UW-Stout, a library search which included an ERIC search, the results of the W.A.T. - I.E. Initial Survey and additional results of notes taken during discussions with initial survey respondents.

The final form of this survey (as of August, 1978) was headed W.A.T. - I.E. Third Survey (See Appendix A, Part 3) is a distillation of the second survey. It was constructed by selecting the responses with the highest Pearson's R correlations (item discrimination) that still allowed a broad spectrum of response topics. Its structure is such that the first portion is entirely attitude statements and the second portion is devoted to "impacts" - factors that have a correlation with attitude statements. Its length is consistent with suggestions from several

student respondents that 40 or fewer responses was a comfortable number. Respondent behavior during the survey was consistent with the just mentioned suggestion.

Instrument Overview. As mentioned above, the W.A.T. - I.E. Initial Survey (Appendix A, Part 1) was used to gather information to help compose and select statements for the second survey. It consisted of four status questions - name, educational level, year in college (if applicable) and college major (if applicable) followed by a request to read "an information definition of industrial education."

After the definition came six check off response questions about their experience with and feelings toward industrial education. Two samples of these questions follow:

"8. Have you wanted to take an industrial education course and not been able to?"

_____ Yes
_____ No
_____ Never Tried

"10. In general, how do you feel about industrial education?"

_____ Really like it
_____ No strong feelings about industrial education
_____ Don't like industrial education
_____ Really don't like industrial education

Questions 11 and 12 asked about high school affiliation (past, present or potential) and birth date.

The final three questions were administered orally and may be found on the fourth and last page of Appendix A, Part 1. Asking these three questions orally allowed group feedback and group pacing. As mentioned earlier, discussions with students of these last three questions often followed the completion and collection of the surveys. Notes taken during those discussions were a valuable supplement to the written results of those questions.

The W.A.T. - I.E. Second Survey (Appendix A, Part 2) used a Likert scale based response. The Likert scale was employed because it is reliable and relatively easy to administer. Likert scale based instruments should be of simple construction and as such were comprehended by most junior high and high school students. Also, the facilities and staff at the UW-Stout Center for Research and Educational Improvement were well equipped to analyze the volume of data inherent in nearly 600 Likert scale based surveys of 69 responses each (About 41,000 total responses).

The initial part of the survey was a personal data section which included name, sex, birth, school and industrial education course exposure responses. Next was the "informal definition of industrial education" followed by an explanation of how to respond to each statement complete with two sample questions.

This section is duplicated here:

This survey has no right or wrong answers, only opinions. All you are asked to do is express your feelings about each statement. You do this by circling the numbers as follows:

Circle 1 if you STRONGLY DISAGREE (SD) with that statement.
Circle 2 if you DISAGREE (D) with that statement.
Circle 3 if it does not apply, you are UNDECIDED (U), have no feeling about, or don't understand that statement.
Circle 4 if you AGREE (A) mildly with that statement.
Circle 5 if you STRONGLY AGREE (SA) with that statement.

(Circle the one response for each item which most clearly describes your own opinion)

Example:	SA	A	U	D	SD
oo I like washing dishes	5	4	3	2	1
o I don't like chocolate ice cream	5	4	3	2	1

After the examples came the body of the survey - 69 response statements of which 41 related specifically to attitudes. Three examples of attitude statements follow:

		SA	A	U	D	SD
16.	Most of our teachers believe that girls should take industrial education	5	4	3	2	1
4.	Industrial education classes are not worth the effort	5	4	3	2	1
44.	I know quite a bit about making and fixing things	5	4	3	2	1

The first example, number 16, was as much a statement of student beliefs (about teachers) as it was a statement about what teachers believe.

Example two, number 4, was a negative statement about industrial education. It was assumed that students who enjoy industrial education would either "disagree" (D) or "strongly disagree" (SD) with such negative statements.

Example three, number 44, was basically a confidence statement. It might also be considered an indirect statement of experience.

Impact statements that relate to factors that may influence student attitudes toward industrial education comprised the remaining 28 statements of the survey. Three examples of Impact Statements follow:

		SA	A	U	D	SD
54.	I have never had a chance to build or fix things	5	4	3	2	1
63.	Industrial education teachers like me . .	5	4	3	2	1
64.	My father wants me to take industrial education classes	5	4	3	2	1

Example one, number 54, was a negative expression about experience. Example two, number 63, was an expression that relates to the industrial education teacher. And, example three, number 64, was an expression of family reinforcement, specifically relating to father's wishes and influence.

The W.A.T. - I.E. Third Survey (Appendix A, Part 3) was a 35 statement version of the second survey. Statements 1 through 20 were attitude related. Statements 21 through 35 applied to impact factors. These statements were

Center for Vocational, Technical and Adult Education
UW-Stout, Form 750.B1

Figure 4a

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ATTITUDES TOWARD - INDUSTRIAL EDUCATION THIRD SURVEY

I. (Please Print) Name _____ Code # _____

II. (Check the correct space) I am a _____ (1) Female _____ (2) Male

III. My birthday is: _____ Month _____ Day _____ Year

IV. The school I am now in is _____ Print Name of School

V. Check your grade level ___ 6, ___ 7, ___ 8, ___ 9, ___10, ___11, ___12.

VI. I have had _____ (number) shop, industrial arts and industrial education courses (include any you are taking now).

NEXT - Please read this definition of what "I.E." or "Industrial Education" is:

An Informal Definition of Industrial Education

Inudstrial Education, or I.E., deals with learning how to make or fix things and how industry makes or fixes things. In many schools, I.E. is known as "industrial arts" or "shop". The subjects taught by I.E. teachers include woodworking, electronics, leatherwork and other crafts, auto repair, printing, metalworking, house construction, and general courses that cover several areas on a beginning level.

Some of the I.E. classes might sound hard, but remember, all I.E. or Industrial Education courses are about learning to make or fix things and how industry makes or fixes things.

Do you have any questions about what "I.E." is? If you have questions, the person who is giving this survey will do his or her best to answer them.

(If your questions have been answered, it is time to start the survey.)

Survey Instructions

THIS SURVEY HAS NO RIGHT OR WRONG ANSWERS, ONLY OPINIONS. All you are asked to do is express your feelings about each statement. You do this by circling the numbers as follows:

Circle 1 if you STRONGLY DISAGREE (SD) with that statement.
Circle 2 if you DISAGREE (D) mildly with that statement.
Circle 3 if it does not apply, you are UNDECIDED (U), have no feelings about, or don't understand that statement.
Circle 4 if you AGREE (A) mildly with that statement.
Circle 5 if you STRONGLY AGREE (SA) with that statement.

(Circle the ONE response for each item which most clearly describes your own opinion)

EXAMPLE:	SA	A	U	D	SD
00 *I like cucumbers*	5	4	3	2	1
0 *Swimming is fun*	5	4	3	2	1

(Please wait - The person giving this survey will ask you to start soon).

Form 730.B2

Figure 4b

Circle 1 if you STRONGLY DISAGREE (SD) with that statement.
Circle 2 if you DISAGREE (D) mildly with that statement.
Circle 3 if it does not apply, you are UNDECIDED (U), have no feelings about, or don't understand that statement.
Circle 4 if you AGREE (A) mildly with that statement.
Circle 5 if you STRONGLY AGREE (SA) with that statement.

(Circle the one response for each item which most clearly describes your own opinion)

		SA	A	U	D	SD
1.	I like to make things	5	4	3	2	1
2.	I know quite a bit about making and fixing things . .	5	4	3	2	1
3.	Industrial Education classes are not worth the effort	5	4	3	2	1
4.	Most of what I learn in Industrial Education class will be useful to me the rest of my life	5	4	3	2	1
5.	Girls need Industrial Education classes just as much as boys do	5	4	3	2	1
6.	Industrial Education classes aren't much fun	5	4	3	2	1
7.	No matter how smart people are, they should still know how to work with their hands	5	4	3	2	1
8.	I like taking Industrial Education classes.	5	4	3	2	1
9.	I'm afraid of Industrial Education teachers	5	4	3	2	1
10.	In Industrial Education, it is fun to learn new things	5	4	3	2	1
11.	I have always wanted to build and fix things . . .	5	4	3	2	1
12.	Industrial Education projects take too long to finish	5	4	3	2	1
13.	I like learning how to build and fix things	5	4	3	2	1
14.	I like the feeling of knowing what I can do	5	4	3	2	1
15.	When I try to fix something, it usually breaks . .	5	4	3	2	1
16.	I will probably use what I learn in Industrial Education for the rest of my life	5	4	3	2	1
17.	I want to take an Industrial Education class next year	5	4	3	2	1
18.	I am afraid of machines	5	4	3	2	1
19.	Fixing things is easy for me	5	4	3	2	1
20.	I feel really proud every time I finish a project	5	4	3	2	1

Figure 4c

Form 730.B3

		SA	A	U	D	SD
21.	My father wants me to take Industrial Education classes	5	4	3	2	1
22.	Some Industrial Education teachers have encouraged me to take Industrial Education classes	5	4	3	2	1
23.	I like running big machines	5	4	3	2	1
24.	Mostof the teachers in my school think Industrial Education is a good thing	5	4	3	2	1
25.	My father often fixes things at home	5	4	3	2	1
26.	Our school has really good Industrial Education teachers	5	4	3	2	1
27.	I have learned a lot about making and fixing things at home	5	4	3	2	1
28.	School counselors encourage me to take Industrial Education classes	5	4	3	2	1
29.	My father often shows me how to make or fix things	5	4	3	2	1
30.	I have never had a chance to build or fix things	5	4	3	2	1
31.	Most girls like Industrial Education classes . .	5	4	3	2	1
32.	Industrial Education classes would be better if we could pick projects in which we are interested	5	4	3	2	1
33.	I like drafting (exact drawings of shapes like houses, machine parts, and other objects)	5	4	3	2	1
34.	Industrial Education teachers like me	5	4	3	2	1
35.	One of the best things about Industrial Education classes is that I can work and move around instead of sitting still all the time	5	4	3	2	1

selected from the second survey using the items that had strong correlations with high survey scores.

Also, modifications were made on the introduction: (1) a sentence was converted to upper case letters and underlined and (2) the example statements were changed.

It was intended that this third form of the survey would be easy to administer and interpret instrument with high reliability and high utility (See Figure 3).

School Characterization. The six schools surveyed were selected with the assistance of Leonard Sterry, Industrial Education Consultant for the Wisconsin Department of Public Instruction. These six schools, although not specifically identified, are described as follows.

School No. 1 - a medium sized high school (enrollment about 1000 for grades 9-12) located in a small town of about 2000 people and described as having a conservative, traditional industrial education program.

School No. 2 - A medium sized middle school (enrollment of about 1000 for grades 7-9) located in a small city (10,000 plus people) which had an innovative and compulsary industrial education program.

School No. 3 - A small high school (enrollment under 500 for grades 9-12) located in a small town (about 1500 people) and exhibiting diversified traditional program of industrial education.

School No. 4 - A medium to large high school (enrollment of about 1500 for grades 9-12) in a medium sized town (about 6000 people). Its program was basically traditional.

School No. 5 - A small high school (enrollment under 500 for grades 9-12) in a small town (about 1000 people) with an innovative program considered to be outstanding.

School No. 6 - A large high school (enrollment about 2000) in a medium sized city (over 30,000 people). It has a large traditional program.

These schools were picked because each had certain distinct characteristics. School number 1 had a traditional, conservative industrial

education program. In contrast, school number 2 and school number 5 both had programs that were innovative to the extent that both were (and are) models for other programs in Wisconsin. Schools numbered 3, 4, and 6 were chosen as "middle of the road" schools. They were of different enrollments, but they all had fairly traditional programs, laced with some innovative and typified by somewhat limited to somewhat open enrollment of women in industrial education courses.

As a group these six schools have some commonalities. They all had active programs, a good to excellent diversity of course offerings, well equipped shops and competent instructors. Again, please note that the focal point of school selection was not "good" and "bad" or "strong" and "weak" programs. What was considered in selecting these schools was school size and traditional vs. innovative programs.

Student Selection. The student selection process varied from school to school as dictated by respective school policy and administrator suggestion. Specific descriptions will be listed in the same order as were the school characteristics. Students were surveyed as follows:

School No. 1 - 68 high school students (in two study halls) were surveyed

School No. 2 - 126 middle school students were surveyed in a series of six compulsary industrial education classes

School No. 3 - 75 high school and junior high school students were surveyed. Of this total, 10 were in a junior high introductory class, and 28 from a family life class. The remaining 37 were from three industrial education classes.

School No. 4 - 96 high school students in one study hall were surveyed

School No. 5 - 84 high school students were surveyed. Thirteen were from a family life class, the remaining 71 came from four industrial education classes.

School No. 6 - 128 high school students were surveyed. Thirty were from two home economics classes and 98 from six industrial education classes.

In schools 3, 5, and 6 home economics or family life classes were surveyed to bring the percentages of women up to at least 35% of the total number of students surveyed.

Data Analysis. All data were analyzed at the University of Wisconsin-Stout Center for Research and Educational Improvement (CREI). The responses of each student were recorded on computer tape by CREI data entry personnel. Four separate analyses were conducted on the entered data.

The first analysis was named "likert." This Likert analysis program generated for each statement values of mean, standard deviation, median, Likert scale composite score and average response for each student. Likert scale composite score and average response for each group, number and respective percentages of people selecting each of the five possible responses, and Pearsons - R correlation between responses on an item and total scores were included in the printout. The first analysis gave information on an item by item and person by person basis. The next three analyses gave information about the results for complete groups or subgroups.

The second analysis was the analysis of variance program. This program had two forms, ANOVA1 and ANOVA2. ANOVA1 is a randomized one-way design for analyzing the significance of variation of the means of results from any number of groups with respect to one variable. ANOVA2 was a two-way design for analyzing the significance of variation of the means of results from any number of groups with respect to two variables.

Both of these programs give probabilities and significance levels for such variations of the means occurring due to chance. The one way program also ranked those means which were significantly greater than other means.

The third analysis, PERSON, was the Pearson product-moment correlation coefficient program. It computed the significance of the correlation between two sets of data and printed out a correlation coefficient, number of pairs, and level of significance.

The fourth and last analysis, KVTTST, was the known value t - test program. This program used the respective means, numbers of scores and standard deviations of scores of groups and printed a t-test score and a statement indicating one group was bigger than another. The test was used to verify results of three two-way analyses of variance that become too ponderous for the computer.

The application and interpretation of these four statistical programs was done under the patient and skillful guidance of Dr. Orville Nelson, Co-Director of the Center for Vocational, Technical and Adult Education (CVTAE) and Tom Prescott, Computer Specialist for both CREI and CVTAE.

Chapter III

RESULTS

Introduction. Results will be presented first in terms of facts, figures and/or tables. A short narrative explanation or expansion of those results will follow. Finally a discussion of those results and a decision as to what extent prescribed objectives have been met (where objectives are involved) will be presented.

Results as related to objectives will be presented first followed by major outcomes of the data analyses of the surveys. A few selected minor outcomes will be presented also.

Objective 1. The stated purpose of objective 1 was "to construct a Likert scale based instrument designed to measure women's attitudes toward industrial education and impacts upon those attitudes." A brief examination of the Instrumentation section of Chapter II and Appendix A should be appropriate at this time.

Such an examination will reveal that two Likert based instruments were developed. As indicated in the Instrumentation section, three surveys were developed. The first Likert based survey was the W.A.T. - I.E. second survey and the second Likert based survey was the W.A.T. - I.E. third survey. The third was designed using item analysis (Pearson's R values in particular) from the second survey. Table 1 shows that when compared to the second survey the third survey has about half the items and essentially the same high Hoyt's reliability and Spearman-Brown reliability factors. An item by item comparison of the Pearson's R correlation coefficients showed generally higher values when the time was a member of the statements

TABLE 1

"A Comparison of W.A.T. - I.E. Second Survey
And W.A.T. - I.E. Third Survey" *

	W.A.T. - I.E. Second Survey	W.A.T. - I.E. Third Survey
Number of Items	69	35
Hoyt's Reliability	0.94	0.93
Spearman - Brown Reliability	0.94	0.94

Data Taken From Appendix B, Parts 1 and 2.

* The "W.A.T. - I.E. Third Survey" is now called "Attitudes towards Industrial Education"

selected for the final survey rather than a member of all statements in the original Likert scale based survey. This general increase of Pearson's R values was probably necessary to maintain the just mentioned reliability factors in spite of the reduced number of items in the final survey.

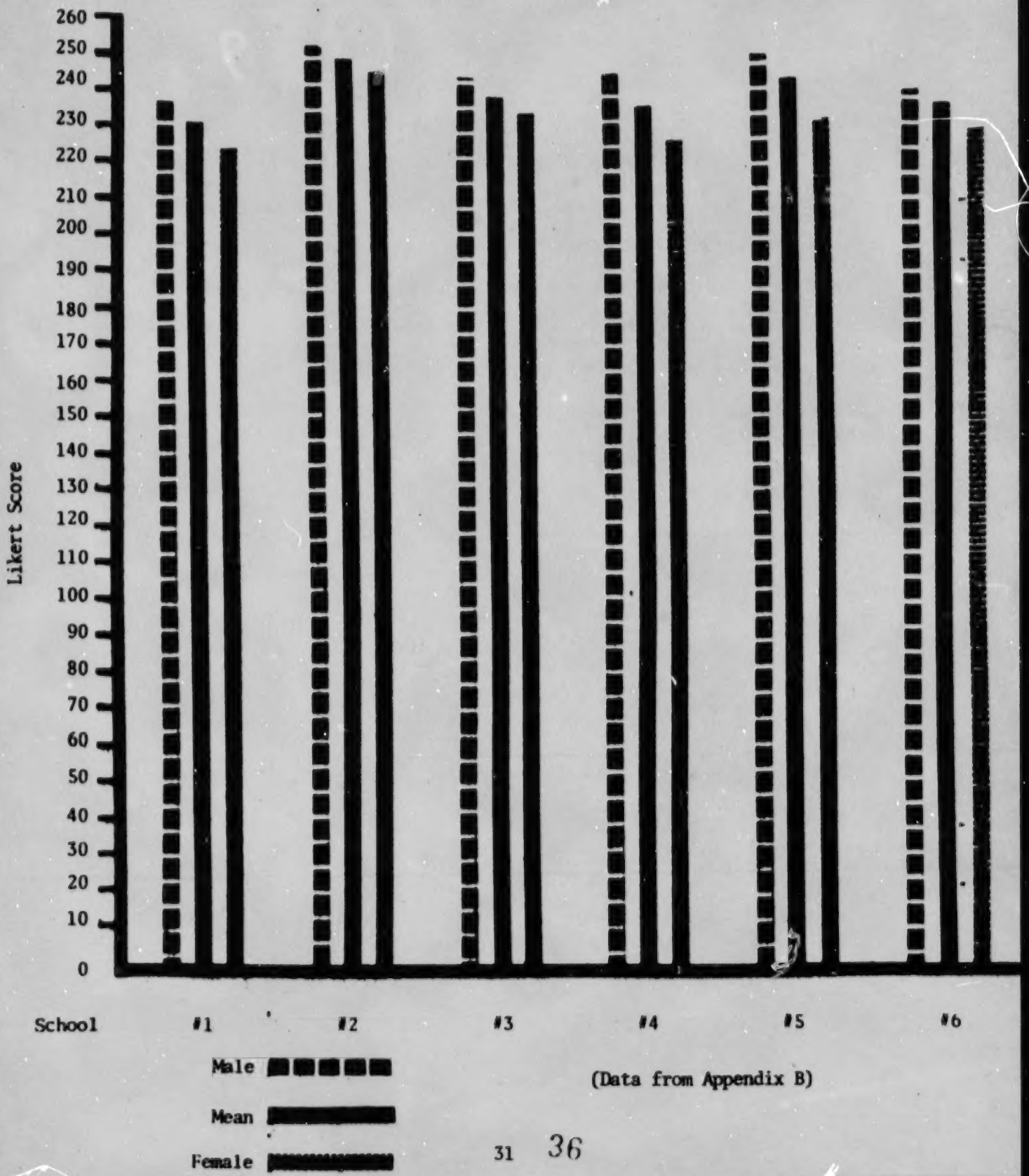
The third survey was viewed as being worth the extra effort needed to develop it. The main value of its reduced length is that it should be easier to administer. It may also prove to have a lower respondent fatigue problem since two pages of responses would seem to be much less intimidating than the almost four pages of responses to the original Likert based response survey. Administration time for the second survey was 20 minutes with 12 to 15 minutes actually devoted to the response section. The final survey should involve most respondents for less than ten minutes of actual item completion.

In view of the fact that two Likert scale based surveys were developed and that the third survey exceeded the second in certain respects, it is argued that objective one has been exceeded.

Objective 2. The goal of the second objective was to "determine the validity and reliability of the instrument." School number 1 was picked as a school with a traditional program, schools 2 and 5 were considered to be the most innovative and the remaining three schools were intermediate in nature. Data from the second survey are graphically represented in Figures 5, 6, and 7. An examination of the means of the survey totals revealed that school number 1 had the lowest mean score of the six schools surveyed. Schools 2 and 5 had the highest means of the six schools.

FIGURE 5

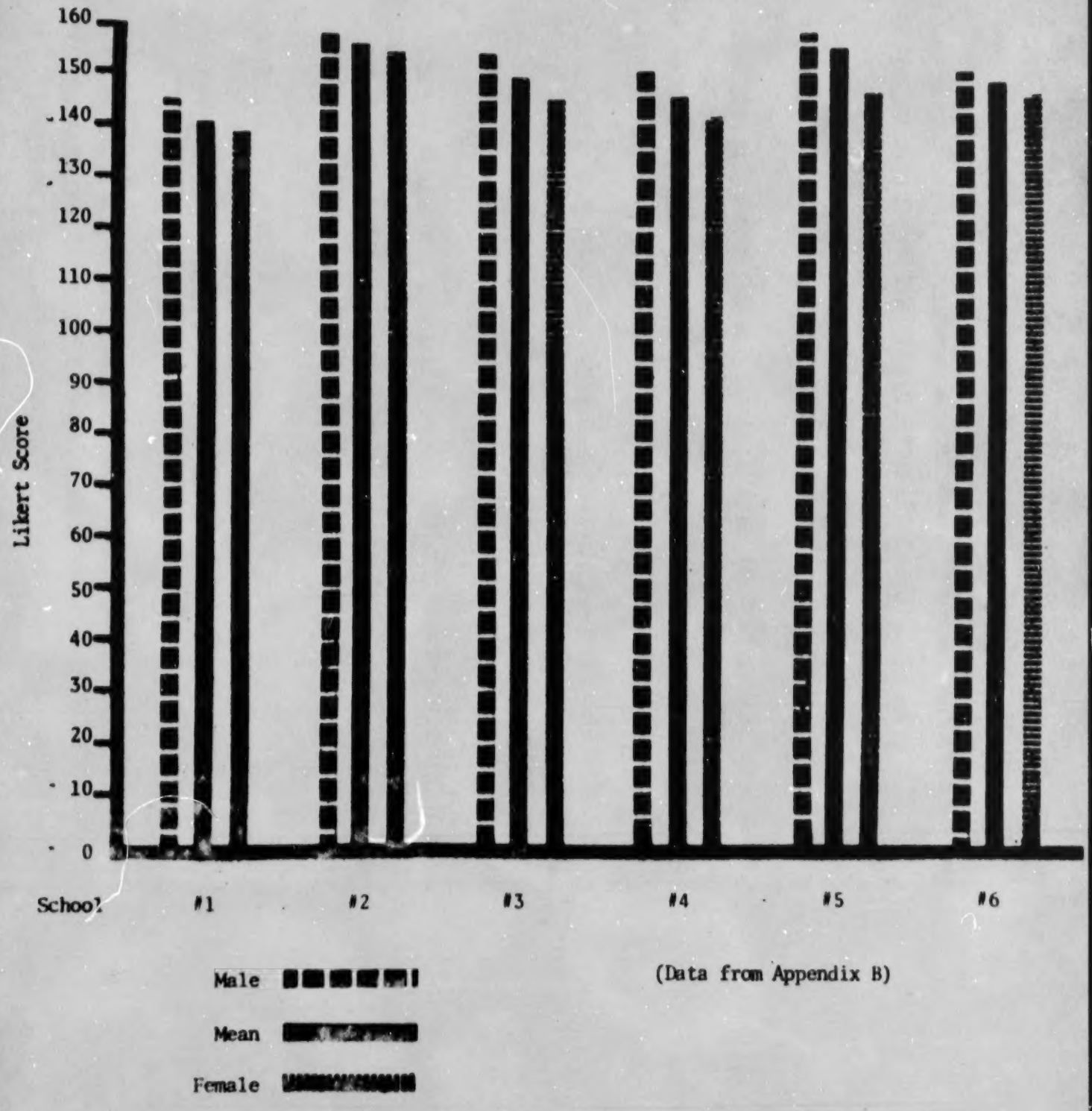
Survey Totals vs. School and Sex



(Data from Appendix B)

FIGURE 6

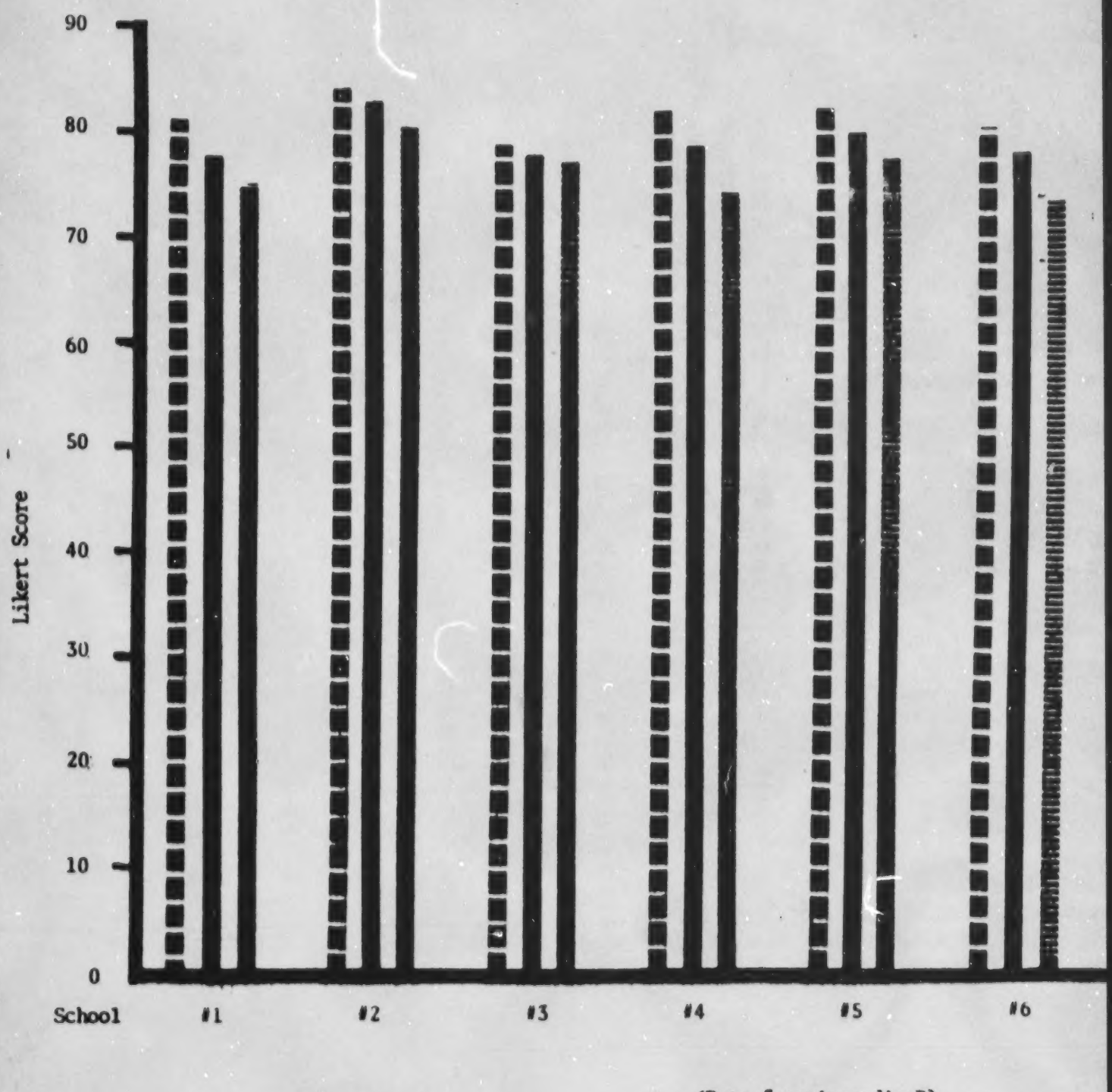
Attitude vs. School and Sex



(Data from Appendix B)

FIGURE 7

Impacts, By School and Sex



(Data from Appendix B)

A one way analysis of variance program was run on the variation of means of each school (Appendix B, Part 3). The results indicated that the means of both schools 2 and 5 were greater than the mean of school 1 at a level of significance of 0.01.

It may be interesting and pertinent to note that school 4 was also identified as having a mean of survey total scores that was lower than the mean of school two at a significance level of 0.01. School 4 was considered one of the three intermediate schools and of the three slightly more traditional than the other two. It appears that the survey may have picked out this difference.

A Pearson product-moment correlation coefficient program was used to calculate the correlation between the second survey composite scores for attitude and impact (Appendix B, Part 3). The correlation coefficient was 0.714 and was significant at the 0.01 level. This indicates a significant relationship between the survey scores for attitudes and the survey scores for impacts of factors that may affect attitudes. In other words, people who had a high impact composite scores tended to have a high attitude composite score and people with low impact composite scores tended to have low attitude scores.

Since the impact statements were designed to measure the status of factors that might affect attitudes, the 0.714 value of the correlation coefficient and the high level of significance of that coefficient was viewed as one indication of validity of the second survey.

Another indication of validity was the consistency with which the total survey scores agreed with the relative perceived status of the schools with respect to traditional and innovative programs. The fact

that school 4 was identified by the survey results as having the second lowest mean survey score and that school 4 was also identified as the most traditional of the three intermediate schools was interpreted as additional support of the argument for validity of the second survey.

The argument for validity of the second survey then had two parts. The first part relied upon the apparent agreement between survey mean totals for each school and perceived characteristics of the programs of each school. The second part relied upon the confirmation of interaction between the attitude and impact sections of the survey.

Objective two had two parts. The first part had to do with the validity of the survey. The survey was judged valid on the strength of the information presented in the previous seven paragraphs. However, it was felt that efforts to validate the third survey would be appropriate at another time.

The second part of objective two was concerned with the reliability of the instrument. The level of acceptable reliability was set at .80. As Table 1 shows, both the Hoyt's reliability and the Spearman-Brown reliability subroutines of the Likert analysis programs produced reliability figures of 0.93 or 0.94 for both the second and third surveys. These levels of reliability were well above the minimum acceptable figures and indicated a high internal consistency of both surveys. Those figures also indicated that the survey could be accepted as reliable. The survey had acceptable validity and reliability. Objective two had been met.

Objective 3. The purpose of objective three was to "prepare and print a manual describing appropriate administration practices and result interpretation for the instrument." That manual was prepared, submitted to and accepted by the thesis committee. Evaluation by Wisconsin secondary teachers had not been accomplished at the time that this thesis was submitted.

It was suggested that secondary teacher evaluation of the readability and utility of the manual be done as part of another research effort. Since the teacher evaluation of the manual was not accomplished, objective three had to be considered partially completed.

Objective 4. The goal of the fourth objective was to "prepare a report on the research involved in constructing and validating the instrument." This is that report. It was prepared and submitted in August, 1978. Its acceptance was considered the completion of objective four.

Summary. Two Likert scale based surveys were constructed. The reliability and validity of the first instrument were found to be acceptable. An administration and interpretation manual was prepared for and evaluated by the thesis committee but not by secondary teachers. The research report was prepared, submitted and accepted. Objective one was met or exceeded, objective two was met, objective three was partially met and objective four was met.

Discussion. Appendix B was constructed entirely of selected results of the analyses of data from the second survey. Some of those results were displayed graphically in figures 5, 6, and 7. This section was added to discuss those results.

The graphs were referred to earlier to illustrate the variation in the mean scores of the six schools. Another variation should have been obvious - in every case, the male respondents had higher mean scores than the females in the same schools. However, the females in school 2 had higher mean scores than males in four other schools. It was also noticed that the similarity between male and female mean scores of school 2 was greater than that of any other school. Some of the differences between school 2 and the other five schools may have been due to the fact that school 2 was a middle school being compared with high schools. The differences

may also be due to the universal exposure of all students in school 2 to industrial education classes. It was also noted that on the basis of attitude totals only (Figure 6), school 3 also had a high degree of similarity between male and female mean scores. School 3 has a program that is extensive for a small high school. Several classes had a modest complement of female students at school 3 and school 3 was the only school in which a majority (52%) agreed or strongly agreed with statement 15 which read "Many popular students take industrial education in our school." In other words, industrial education was an agreeable part of the course offerings for both male and female students at school 3. It was decided that further research into the nature of the male-female differential of survey means was therefore one of the main recommendations of this report.

Lastly, some individual response variations, both school and sex related seemed worthy of note. School 5 has a staff that was reported to be very hard working. Student comprehension of this situation was demonstrated by the fact that 50% of the respondents circled the strongly agree column for Item 51 which states, "Our school has really good industrial education teachers." School 2 was next with 37% strongly agree. The mean response for this item which includes the responses from the two schools mentioned is only 28%. It was no surprise to find that Item 55 had a high Pearson's R value of .614. This value indicates that people who agreed or strongly agreed with Item 55 very often had high scores on the whole survey.

The only two impact statements that had higher Pearson's R values were statement 52, "I have learned a lot about making and fixing things at home." (Pearson's R value of .623) and statement 66, "One of the best things about industrial education classes is that I can work and move

around instead of sitting still all the time." Statements 55, 56, and 66 both in their respective degrees of acceptance to students and their collective high correlation with high attitude scores seemed to indicate that teacher, family and activity were important contributors to expressed attitude about industrial education.

Item 59, "I like the feeling of know what I can do" was an admittedly general statement. It was also a statement that had an almost identical response pattern for males and females (See Table 2).

It was noted that over 90% of males and females agreed or strongly agreed with the statement. The content and positive uniformity with respect to sex of the results of Item 59 were then compared with Item 44, "I know quite a bit about making and fixing things." The computer generated Likert analysis of Items 44 and 50 are presented in Table 3.

Item 44 was a statement of knowledge and in a respect self confidence. The male mean was almost a full response (0.88 of a response level) higher than the female mean, and the median (middle score) of the male group was a little over one response level higher than the median response of the females. Seventy percent of the males agreed that they knew a good amount about fixing and making things. Of the females, only 31%, less than half, marked the positive responses.

Item 50 was a less extreme case. The statement was basically a statement of experience with and expectation of failure. It was a negative statement - disagreement was in order. Yet on a percentage basis for every two males who agree with this failure statement, more than three females would have done the same. Conversely, for every three females who responded to the contrary of the statement, four males would disagree.

Table 2

REPRODUCTION OF TWO SEGMENTS OF
A LIKERT ANALYSIS OF MALE AND FEMALE
ITEM MEANS OF THE W.A.T. - I.E. SECOND SURVEY
Information from Appendix B,

ITEM	MEAN	STAN-DEV	MEDIAN	P-COR	0	1	2	3	4	5	6	7	
59	4.44	0.68	4.52	0.635	0.03	0.01	0.00	0.04	0.42	0.50			
	Q1=3.95	Q3=5.01	IQR=1.06		9	3	1	13	138	163			Males
59	4.43	0.68	4.48	0.567	0.01	0.01	0.00	0.02	0.47	0.48			
	Q1=3.95	Q3=4.99	IQR=1.04		3	3	1	5	117	121			Females

Table 3

REPRODUCTION OF FOUR SEGMENTS OF
A LIKERT ANALYSIS OF MALE AND FEMALE
ITEM MEANS OF THE W.A.T. - I.E. SECOND SURVEY
Information from Appendix B, Part

ITEM		MEAN	STAN-DEV	MEDIAN	P-COR	0	1	2	3	4	5	6	7
MALE	44	3.81	0.99	3.95	0.621	0.03	0.02	0.10	0.16	0.46	0.24		
		Q1=3.27	Q3=4.48	IQR=1.22		10	6	34	51	149	77		
FEMALE	44	2.93	1.07	2.92	0.479	0.02	0.08	0.27	0.32	0.24	0.07		
		Q1=2.09	Q3=3.75	IQR=1.66		5	21	68	80	59	17		
MALE	50*	2.32	1.12	2.11	0.439	0.04	0.22	0.43	0.17	0.08	0.06		
		Q1=1.55	Q3=2.94	IQR=1.39		12	72	140	55	27	21		
FEMALE	50*	2.78	1.08	2.57	0.360	0.02	0.07	0.40	0.28	0.14	0.09		
		Q1=1.94	Q3=3.45	IQR=1.52		4	18	100	70	35	23		

Combining Items 59, 44 and 50 gave a picture of the population that uniformly liked knowing what it could do on one hand. Yet on the other hand, more males than females in that population indicated that they thought they knew about making and fixing things.

Finally, the following was added to the picture just mentioned. In several discussion sessions with female high school students, a question was asked about the desire to learn (or learn more) about fixing or making things. The expressed desire to learn more was there, but the idea being in a class with males enrolled was objectionable. Why? The overriding objection or fear as the case may be was that since males knew so much already, they would make the girls look foolish.

At that point, a question like the following was posed, "Would it be easier for female students if they joined the males in middle schools or junior high schools when every student, male and female, would be starting at about the same point?" The question usually caused the students to pause, think, and then indicate often almost in unison, that they thought it would be easier. If Item 50 was any indication, experience and success in making and fixing things seemed to be important prerequisites to at least one facet of self-satisfaction. It seemed, in other words, that if a person, male or female, liked the feeling of knowing what they could do, they had better know how to do something. With respect to schooling, learning how to do something, as far as females were concerned was best initiated before high school, especially if males were to be in classes also. It was within that context that recommendation one was made.

Summary. The instrument developed in this study was sensitive to factors that influenced perceptions and attitudes toward industrial education.

A significant and high correlation was found between the impacts and attitudes. For example, innovative programs which enroll sizable numbers of females are perceived more positively.

Chapter IV

RECOMMENDATIONS

A grant from the Wisconsin Department of Public Instruction (DPI) made the scope of this survey possible. Because of the unique position in the Wisconsin educational community of DPI, it was to that department that the first recommendation was made.

Recommendation One. It was recommended that the Wisconsin Department of Public Instruction examine ways to encourage and assist the development and continuation of industrial education programs in Wisconsin middle schools and junior high schools. It was assumed that an intrinsic part of such an effort would be an open inclusion of female as well as male students into such programs.

Recommendation Two. It was suggested that a larger study of secondary schools, both pre-high school and high school be undertaken. The third survey would lend itself to such a project. Further validation of the survey was thought to be an important part of that larger study. In addition, this study would provide a representative picture of the perceptions of women toward industrial education.

Recommendation Three. It was recommended that the UW-Stout CVTAE and CREI individually or jointly explore and pursue the lines of research suggested by and in this pilot study.

Recommendation Four. Several home economics teachers encountered during the survey administration phase suggested that a similar home economics based survey be developed. It was also felt that a combined home economics/ industrial education survey might be possible.

Recommendation Five. A study of junior high and middle schools relative to the existance or absence of industrial education programs which enroll significant number of girls was suggested.

Recommendation Six. Development of an optical scan response sheet to aid larger studies seemed a worthwhile effort.

Recommendation Seven. Another line of research suggested was a study of attitudes over time. This study could be given the impact, if any, of middle school or junior high school programs upon those same students in high school. It might also be administered to incoming students at UW-Stout or other post-secondary institutions.

Recommendation Eight. It was also suggested that if recommendation seven were carried out at UW-Stout that industrial education classes might administer and interpret those surveys as part of their learning experience especially if a survey like that suggested in recommendation four was used.

Recommendation Nine. Many of the individual impact items of the second survey could be expanded into studies on the significance of that impact. Also, studies ranking the relative importance of impacts using the Delphi method seemed to have interesting potential.

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APPENDIX A

EXAMPLES OF THE THREE FORMS OF WOMEN'S ATTITUDES TOWARD INDUSTRIAL EDUCATION "W.A.T. - I.E." Plus Survey Manual

Part One - Initial Survey

Part Two - Second Survey

Part Three - Third Survey

Part Four - Third Survey Manual

W.A.T. - I.E. Initial Survey

1. Name _____ Code # _____
(Please print)

2. Education (Please check one): _____ Junior High School, _____ Senior High School,
_____ College

If you are in college, please answer questions 3 and 4. If not, start the directions for questions 5 through 12.

3. Year in College: _____ 1st; _____ 2nd; _____ 3rd; _____ 4th;
_____ Graduate; _____ Other _____
(one-two word description)

4. College Major: _____ Industrial Education; _____ Home Economics;
_____ Industrial Technology; _____ Other _____
(one-two word description)

What is your concentration? _____
(one-two word description, or "general" or "none")

Directions for Questions 5-12:

Please read the sheet entitled "An Informal Definition of Industrial Education" and then answer questions 5-12.

5. Would you like to learn the kinds of things taught in I.E.?

_____ Yes
_____ No

6. Have you taken (or are you taking) any kind of industrial education course?

_____ Yes
_____ No

7. Were (or are) these courses required?

_____ Yes
_____ No
_____ I didn't take any

8. Have you wanted to take an I.E. course and not been able to?

_____ Yes
_____ No
_____ Never tried

9. If you have had (or are taking) an I.E. course, did you generally like it?

_____ Yes
_____ No
_____ No I.E. courses taken

10. In general, how do you feel about industrial education?

_____ Really like it
_____ No strong feelings about I.E.
_____ Don't like I.E.
_____ Really don't like I.E.

11. What high school did you (or are you or will you) attend?

12. Birth Date: _____ (month) _____ (day) _____ (year)

Thank you for finishing the first part of the survey. The person giving you this survey will have some questions for you that will require longer answers.

An Informal Definition of Industrial Education

Industrial Education, or I.E., deals with learning how to make or fix things. In many schools, I.E. is know as "industrial arts" or "shop". The subjects taught by I.E. teachers include woodworking, electronics, leatherwork and other crafts, auto repair, printing, metal-working, house construction, and general courses that cover several areas on an easy level.

Some of the I.E. classes might sound hard, but remember, all I.E. or Industrial Education courses are about learning to make or fix things.

QUESTION 13 - What people or what "things" help or encourage you to like Industrial Education kinds of courses? (What are the reasons for liking I.E.?)

QUESTION 14 - What people or what "things" discourage you from liking Industrial Education kins of courses? (What are the reasons for not liking I.E.?)

QUESTION 15 - Look at question 8 above. What are the reasons (if any) that you were not able to take an Industrial Education course that you wanted to take.

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W.A.T. - I.E. Second Survey

I. Name _____ Code # _____

II. (Check the correct space) I am a _____ (1) Female _____ (2) Male

III. My birthday is: _____ _____ _____
month day year

IV. The school I am now in is _____ _____
name of school grade

V. I have had _____ (number) shop, industrial arts, and industrial education courses (include any you are taking now).

NEXT - Please read this definition of what "I.E." or "Industrial Education" is:

An Informal Definition of Industrial Education

Industrial Education, or I.E., deals with learning how to make or fix things and how industry makes or fixes things. In many schools, I.E. is known as "industrial arts" or "shop". The subjects taught by I.E. teachers include woodworking, electronics, leatherwork and other crafts, auto repair, printing, metalworking, house construction, and general courses that cover several areas on a beginning level.

Some of the I.E. classes might sound hard, but remember, all I.E. or Industrial Education courses are about learning to make or fix things and how industry makes or fixes things.

Do you have any questions about what "I.E." is? If you have questions, the person who is giving this survey will do his or her best to answer them.

(If your questions have been answered, it is time to start the survey.)

This survey has no right or wrong answers, only opinions. All you are asked to do is express your feelings about each statement. You do this by circling the numbers as follows:

Circle 1 if you STRONGLY DISAGREE (SD) with that statement.
Circle 2 if you DISAGREE (D) mildly with that statement.
Circle 3 if it does not apply, you are UNDECIDED (U), have no feelings about, or don't understand that statement.
Circle 4 if you AGREE (A) mildly with that statement.
Circle 5 if you STRONGLY AGREE (SA) with that statement.

(Circle the one response for each item which most clearly describes your own opinion)

EXAMPLE:

		SA	A	U	D	SD
00	*I like washing dishes*	5	4	3	2	1
0	*I don't like chocolate ice cream*	5	4	3	2	1

- over please -

Form 730.A2

Circle 1 if you STRONGLY DISAGREE (SD) with that statement.
Circle 2 if you DISAGREE (D) mildly with that statement.
Circle 3 if it does not apply. you are UNDECIDED (U), have no feelings about, or don't understand that statement.
Circle 4 if you AGREE (A) mildly with that statement.
Circle 5 if you STRONGLY AGREE (SA) with that statement.

(Circle the one response for each item which most clearly describes your own opinion)

		SA	A	U	D	SD
1.	Both men and women need to know how to fix things	5	4	3	2	1
2.	Boys need industrial education classes more than girls do	5	4	3	2	1
3.	The people who take industrial education classes are planning ahead	5	4	3	2	1
4.	Industrial education classes are not worth the effort	5	4	3	2	1
5.	I like industrial education classes about the same as other classes I am taking	5	4	3	2	1
6.	Industrial education classes make English and math seem more useful	5	4	3	2	1
7.	I would like to be an industrial education teacher	5	4	3	2	1
8.	Girls should be able to take any industrial education class they want to	5	4	3	2	1
9.	In industrial education, I can <u>use</u> what I learn in other classes	5	4	3	2	1
10.	I wish there were more women industrial education teachers	5	4	3	2	1
11.	Girls need industrial education classes just as much as boys do	5	4	3	2	1
12.	Usually students with poor grades take industrial education	5	4	3	2	1
13.	Girls who take industrial education classes get better jobs after high school	5	4	3	2	1
14.	Most of what I learn in industrial education class will be useful to me the rest of my life .	5	4	3	2	1
15.	Many popular students take industrial education in our school	5	4	3	2	1

- please go on to the next page -

Form 730.A3

		SA	A	U	D	SD
16.	Most of our teachers believe that girls should take industrial education	5	4	3	2	1
17.	No matter how smart people are, they should still know how to work with their hands	5	4	3	2	1
18.	Girls should have to take some industrial education class in seventh and eighth grade	5	4	3	2	1
19.	Everybody should have to take industrial education in seventh and eighth grade	5	4	3	2	1
20.	Power tools are too heavy for girls to use . .	5	4	3	2	1
21.	Industrial education is okay - not bad, not great, just okay	5	4	3	2	1
22.	I like taking industrial education classes . .	5	4	3	2	1
23.	I want to take an industrial education class next year	5	4	3	2	1
24.	Industrial education classes make school more fun	5	4	3	2	1
25.	Some industrial education teachers have encouraged me to take industrial education classes	5	4	3	2	1
26.	I wish industrial education classes had less reading, writing and tests	5	4	3	2	1
27.	I would like to take an industrial education class taught by a woman	5	4	3	2	1
28.	I like to make things	5	4	3	2	1
29.	It is hard to do projects that don't interest me	5	4	3	2	1
30.	I usually finish projects in time	5	4	3	2	1
31.	Industrial education classes aren't much fun .	5	4	3	2	1
32.	Tools are fun to use	5	4	3	2	1
33.	I'm afraid of industrial education teachers . .	5	4	3	2	1
34.	I like running big machines	5	4	3	2	1
35.	Industrial education projects take too long to finish	5	4	3	2	1
36.	I don't mind doing things over	5	4	3	2	1
37.	Industrial education teachers are usually friendly people	5	4	3	2	1

- over please -

Form 730.A4

		SA	A	U	D	SD
38.	Most of the teachers in my school think industrial education is a good thing	5	4	3	2	1
39.	My father often fixes things at home	5	4	3	2	1
40.	In industrial education. it is fun to learn new things	5	4	3	2	1
41.	It is hard to get into industrial education classes	5	4	3	2	1
42.	Our school needs more industrial education equipment	5	4	3	2	1
43.	School counselors encourage me to take industrial education classes	5	4	3	2	1
44.	I know quite a bit about making and fixing things	5	4	3	2	1
45.	My father often shows me how to make or fix things	5	4	3	2	1
46.	I don't mind cleaning up at the end of class .	5	4	3	2	1
47.	If industrial education teachers let me know that they want me in their classes, what other students think will not bother me too much . .	5	4	3	2	1
48.	Industrial education teachers should pay more attention to the girls in their classes . . .	5	4	3	2	1
49.	I like learning how to build and fix things .	5	4	3	2	1
50.	When I try to fix something, it usually breaks	5	4	3	2	1
51.	Our school has really good industrial education teachers	5	4	3	2	1
52.	I have learned a lot about making and fixing things at home	5	4	3	2	1
53.	Most girls like industrial education classes .	5	4	3	2	1
54.	I have never had a chance to build or fix things	5	4	3	2	1
55.	Industrial education classes would be better if we could pick projects in which we are interested	5	4	3	2	1
56.	I wish we had more kinds of industrial education classes to choose from in our school	5	4	3	2	1
57.	I have always wanted to build and fix things .	5	4	3	2	1
58.	We should have more time to work on industrial education projects	5	4	3	2	1

- please go on to the next page -

Form 730.A5

		SA	A	U	D	SD
59.	I like the feeling of knowing what I can do . .	5	4	3	2	1
60.	I like drafting (exact drawings of shapes like houses, machine parts, and other objects) . . .	5	4	3	2	1
61.	I will probably use what I learn in industrial education for the rest of my life	5	4	3	2	1
62.	Fixing things is easy for me	5	4	3	2	1
63.	Industrial education teachers like me	5	4	3	2	1
64.	My father wants me to take industrial education classes	5	4	3	2	1
65.	Women can teach industrial education classes as well as men do	5	4	3	2	1
66.	One of the best things about industrial education classes is that I can work and move around instead of sitting still all the time . .	5	4	3	2	1
67.	I feel really proud every time I finish a project	5	4	3	2	1
68.	I am afraid of machines	5	4	3	2	1
69.	I think there should be more women industrial education teachers	5	4	3	2	1

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ATTITUDES TOWARD - INDUSTRIAL EDUCATION THIRD SURVEY

I. (Please Print) Name _____ Code # _____

II. (Check the correct space) I am a _____ (1) Female _____ (2) Male

III. My birthday is: _____ Month _____ Day _____ Year

IV. The school I am now in is _____ Print Name of School

V. Check your grade level ___ 6, ___ 7, ___ 8, ___ 9, ___ 10, ___ 11, ___ 12.

VI. I have had _____ (number) shop, industrial arts and industrial education courses (include any you are taking now).

NEXT - Please read this definition of what "I.E." or "Industrial Education" is:

An Informal Definition of Industrial Education

Inudstrial Education, or I.E., deals with learning how to make or fix things and how industry makes or fixes things. In many schools, I.E. is known as "industrial arts" or "shop". The subjects taught by I.E. teachers include woodworking, electronics, leatherwork and other crafts, auto repair, printing, metalworking, house construction, and general courses that cover several areas on a beginning level.

Some of the I.E. classes might sound hard, but remember, all I.E. or Industrial Education courses are about learning to make or fix things and how industry makes or fixes things.

Do you have any questions about what "I.E." is? If you have questions, the person who is giving this survey will do his or her best to answer them.

(If your questions have been answered, it is time to start the survey.)

Survey Instructions

THIS SURVEY HAS NO RIGHT OR WRONG ANSWERS, ONLY OPINIONS. All you are asked to do is express your feelings about each statement. You do this by circling the numbers as follows:

Circle 1 if you STRONGLY DISAGREE (SD) with that statement.
Circle 2 if you DISAGREE (D) mildly with that statement.
Circle 3 if it does not apply, you are UNDECIDED (U), have no feelings about, or don't understand that statement.
Circle 4 if you AGREE (A) mildly with that statement.
Circle 5 if you STRONGLY AGREE (SA) with that statement.

(Circle the ONE response for each item which most clearly describes your own opinion)

EXAMPLE:

		SA	A	U	D	SD
00	*I like cucumbers*	5	4	3	2	1
0	*Swimming is fun*	5	4	3	2	1

(Please wait - The person giving this survey will ask you to start soon).

Form 730.B2

Circle 1 if you STRONGLY DISAGREE (SD) with that statement.
Circle 2 if you DISAGREE (D) mildly with that statement.
Circle 3 if it does not apply, you are UNDECIDED (U), have no feelings about, or don't understand that statement.
Circle 4 if you AGREE (A) mildly with that statement.
Circle 5 if you STRONGLY AGREE (SA) with that statement.

(Circle the one response for each item which most clearly describes your own opinion)

		SA	A	U	D	SD
1.	I like to make things	5	4	3	2	1
2.	I know quite a bit about making and fixing things	5	4	3	2	1
3.	Industrial Education classes are not worth the effort	5	4	3	2	1
4.	Most of what I learn in Industrial Education class will be useful to me the rest of my life	5	4	3	2	1
5.	Girls need Industrial Education classes just as much as boys do	5	4	3	2	1
6.	Industrial Education classes aren't much fun	5	4	3	2	1
7.	No matter how smart people are, they should still know how to work with their hands	5	4	3	2	1
8.	I like taking Industrial Education classes.	5	4	3	2	1
9.	I'm afraid of Industrial Education teachers	5	4	3	2	1
10.	In Industrial Education, it is fun to learn new things	5	4	3	2	1
11.	I have always wanted to build and fix things	5	4	3	2	1
12.	Industrial Education projects take too long to finish	5	4	3	2	1
13.	I like learning how to build and fix things	5	4	3	2	1
14.	I like the feeling of knowing what I can do	5	4	3	2	1
15.	When I try to fix something, it usually breaks	5	4	3	2	1
16.	I will probably use what I learn in Industrial Education for the rest of my life	5	4	3	2	1
17.	I want to take an Industrial Education class next year	5	4	3	2	1
18.	I am afraid of machines	5	4	3	2	1
19.	Fixing things is easy for me	5	4	3	2	1
20.	I feel really proud every time I finish a project	5	4	3	2	1

- please go to the next page -

Form 730.B3

		SA	A	U	D	SD
21.	My father wants me to take Industrial Education classes	5	4	3	2	1
22.	Some Industrial Education teachers have encouraged me to take Industrial Education classes	5	4	3	2	1
23.	I like running big machines	5	4	3	2	1
24.	Most of the teachers in my school think Industrial Education is a good thing	5	4	3	2	1
25.	My father often fixes things at home	5	4	3	2	1
26.	Our school has really good Industrial Education teachers	5	4	3	2	1
27.	I have learned a lot about making and fixing things at home	5	4	3	2	1
28.	School counselors encourage me to take Industrial Education classes	5	4	3	2	1
29.	My father often shows me how to make or fix things	5	4	3	2	1
30.	I have never had a chance to build or fix things	5	4	3	2	1
31.	Most girls like Industrial Education classes . .	5	4	3	2	1
32.	Industrial Education classes would be better if we could pick projects in which we are interested	5	4	3	2	1
33.	I like drafting (exact drawings of shapes like houses, machine parts, and other objects)	5	4	3	2	1
34.	Industrial Education teachers like me	5	4	3	2	1
35.	One of the best things about Industrial Education classes is that I can work and move around instead of sitting still all the time	5	4	3	2	1

MANUAL FOR ADMINISTRATION AND INTERPRETATION OF THE "ATTITUDES TOWARD INDUSTRIAL EDUCATION" SURVEY A 35 QUESTION LIKERT SCALE BASED INSTRUMENT

This information is intended for use with the survey, "Attitudes Toward Industrial Education", a 35 response Likert scale based instrument developed at the UW-Stout Center for Vocational, Technical and Adult Education (CVTAE) by Peter Cupery, under the guidance of Dr. Orville Nelson. This manual was developed under a grant from Wisconsin Department of Public Instruction, Bureau of Career and Manpower Development.

Introduction

The purpose of the attitudes toward Industrial Education survey is to measure students perceptions and opinions toward Industrial Education in your school. Two parts are included in the test. Part I, items 1-20, measure the students attitudes toward Industrial Education. Part II, items 21-35, measure the impacts or factors that have influenced these attitudes.

This survey is based upon a format that provides a series of statements with which the person taking the survey can:

1. Strongly Agree (SA) by circling response 5,
2. Agree (A) by circling response 4,
3. Be Undecided (U) or have no opinion or indicate that the statement does not apply by circling response 3,
4. Disagree (D) by circling response 2, or
5. Strongly Disagree (SD) by circling response 1.

At this time it is suggested that you read through the survey. Please be sure you understand tha information and directions on the first page.

SCORING

Now, consider the two examples at the bottom of the first page. A person who really loves cucumbers and swimming would probably circle both fives. Adding the two responses together would give the highest possible score, ten, for a two statement survey. A person who hated both would probably score a total two, the lowest score possible.

The total score alone is not enough, a cucumber hating swimmer (one plus five equals six), a cumcumber loving non-swimmer (five plus one equals six), and an undecided individual (three plus three equals six) would all score the same. Key individual items as well as total scores must be looked at to get a better picture of how people feel about something.

Incidentally, the reason that the sample items have swimming and cucumbers as topics is the emphasize that the statements and responses are just based on feelings and opinions and not based on "facts". As the instructions indicate, the survey has no right or wrong answers.

So far scoring is simple - the score is the total of the circled numbers when they are added. The high or most positive score is five times the number of statements, or 175 for this test. The low or most negative score is one times the number of statements or 35. The middle, neutral, or undecided score is three times the number of statements, or 105.

Negative statements, an important note. If a cucumber lover saw the statement "Cucumbers taste bad," response one "strongly disagree," would probably be circled to show strong disagreement. To show that this person likes cucumbers, the score value of responses to negative statements is reversed. For the example above, a person selecting a strongly disagree response would have 5 points added to his/her total score. The negative statements in this survey are 3, 6, 9, 12, 15, 18 and 30. For those seven statements, reverse the scoring scale to determine the persons' scores for these items. This table may help:

For Statements 3, 6, 9, 12, 15 18:

If one is circled, add five to the person's total score
If two is circled, add four
If three is circled, add three
If four is circled, add two
If five is circled, add one

The Center for Vocational, Technical and Adult Education has a computer program which computes total scores as discussed above.

MEANS

Mean Score. Means are usually called averages. To find the mean score of ten scores, add the ten scores and divide that total by ten (Mean = sum of scores/number of scores.) The answer should be between the highest and lowest score. Now for a statement to cover any number of scores.

To find the mean of any number of scores, add those scores and divide that total by the number of scores. This number is the mean score.

Item Mean. The same is true for any item. Just add the item response values together and divide by the number of people responding to that item. Experience has indicated that it is easier to understand and interpret items means which are calculated from the response choices (numbers) selected on the instrument. If this approach is used, item means will represent the respondent's reactions to each item.

SURVEY AIMINISTRATION

This section describes a procedure that should help assure that all students will take the survey under approximately equal conditions. About twenty minutes are needed to give the survey.

Environment. A classroom, study hall, or other setting comfortable to the students is recommended. An explanation of the purpose and importance of the

survey is often helpful. Remember, for this survey, the students are "the real experts."

Verbal Instructions. To make sure that the students understand the survey completion procedure, it is suggested that the following instructions be read aloud:

(First Page, Top Third)

I. "Please print your name in the space provided next to Roman numeral I" (enter code number as needed)

II. "For Roman numeral II, if you are a female, put a check before the one. If you are a male, put a check before the two.

III. "For Roman numeral III, write down the month, day and year of your birthday."

IV. "For Roman numeral IV, print the name of your school."

V. "For Roman numeral V, check your grade level."

VI. "For Roman numeral VI, write the number of shop, industrial arts, or industrial education courses you have had. Include any such courses that you are taking now."

(First Page, Middle Third)

- "Please read the informal definition of Industrial Education to yourself as I read it aloud."

(Read the definition)

- Ask the students to, "Please read the definition again. See if you have any questions about what Industrial Education is. You have one minute."

(Pause for one minute)

- (Ask for questions. If any unusually tough questions come up or students seem confused, write a description of the problem below to help better orient future test administrators.)

- (Tell the students) "If your questions have been answered, it is time to start the survey."

(First Page, Bottom Third)

- (Ask all students to,) "Please read the survey instructions on the lower third of the page." (This should take 45 seconds to a minute to complete.)
- (Ask the students) "Any questions?"
- (When they finish asking questions, tell them) "I want everybody who really likes cucumbers to raise their hand." (Pause) "You should circle number five." (Then,) "Raise your hands if you like cucumbers a bit." (Pause) "You should circle number four." (Then the same for undecided, not sure, does not apply; disagree and strongly disagree.)
- Do the same for "swimming is fun" if need be.
- (If the students seem to understand, ask them to start after telling them to) "Remember, this survey has no right or wrong answers only your opinions. Please start the survey."

Collect the surveys as they are completed. Score each survey and write the total score at the top of the first page of the survey. (Remember to reverse the scoring scale on the negative items.)

Find the mean score. (Remember, add the total scores together and divide by the numer of surveys scored.)

Once scoring and finding the mean score are finished, it is time for interpretation.

INTERPRETATION

Just as there is no "right" and "wrong" on the surveys, there are no "good" and/or "bad" results. There are, however, total scores, mean scores and item means which reflect different perceptions and feelings.

A total score is the total points that one person scored for the entire survey. Eact item will contribute 1 to 5 points to the toal score. It will be a number between 35 and 175. This score may vary widely from person to person.

The mean score of a group is found by adding the total survey scores from the people in that group and dividing that total by the number of people in the group. Typical groups are made up of all the people taking a certain course; a school class - the class of 1984, for instance; all students in a school; the people having a certain instructor; and any group that is of interest to the people giving the survey. Groups of less than ten will probably be too small to give very reliable results, broups larger than thirty will be large enough to give quite reliable results.

An item mean is the mean of the responses on an item for a given group. As probably expected by now, item values for one item, say number 20, are added and that total is divided by the number of surveys involved. The resulting number should be between one and five. The mean will represent the "typical" response to that item.

What Means Indicate. The survey total scores, mean score, and item means are indications of what people feel or think they feel. The results can be used as a guide. For example, if a group has a mean score much below the 127.5 reference mean for nearly six hundred students in six schools in Wisconsin, the group has a less positive perception of Industrial Education than the pilot group. If the item mean is 2.5 or less on item 28, school counselors may be a factor influencing the mean total score downward. Working with the counselors to convince them of the value of Industrial Education to students might have a substantial effect on the whole program.

The remainder of the survey interpretation section will give:

1. A score to compute
2. Means from the reference surveys just mentioned above
3. A suggestion of what the mean means and what constructive activities might be pursued as a result of your interpretation.

A. Individual Scores vary widely about the 127.5 mean score. A survey with an individual score much below 110 should be examined for patterns of low responses, especially in statements 21 through 35. (See steps E-M, below) A low individual score might be a signal to have a comfortable, non-threatening discussion with the student.

B. Mean Scores preferrably from 30 or more people. Shoule be close to the 127.5 reference mean. Boys often score about 5% higher, about a 131 mean score. In this case, the girls would be expected to score about a 124 mean score. Variation in mean scores between males and females that are greater than that indicate a need to provide females with more information and exposure to Industrial Education programs. (Sub-sections E through M below should explain some constructive actions that can be taken. Similar actions for males and females should be considered if mean scores approach or go below 120.) Or you may wish to establish a goal to bring the mean score of females up to that of the males.

C. Attitude Section. This section concentrates on what students feel about Industrial Education. Items one through twenty are in this section.

D. Impact Section. This section contains statements that may reveal what factors influence the attitude responses for individuals and for groups. The reference surveys indicated that the most significant factors influencing attitudes were the family - especially father, the Industrial Education teacher, and the activity oriented nature of the course. Items 21 through 35 are in this section.

E. Confidence. Item two (item mean 3.4, male item mean 3.8, female item mean 2.9) gives an indication of experience and resulting self confidence.

This item may be higher after some exposure to Industrial Education. Try it and see!

F. Teacher Encouragement. Item 22 (item mean 3.05, male item mean 3.37, female item mean 2.63) The reference means are not outstanding on this item. Itam means at this level suggests some plain public relation efforts are needed.

G. Power Tool Fear. Item 23 (item mean 3.71, male mean 4.05, female mean 3.25) Lower item means suggest an effort to expose students to proper use of power equipment and encouraging some experience of these machines.

H. Counselor Input. Item 28 (item mean 2.62, amle item mean 2.82, female mean 2.36) As the reference survey indicates counselors are not encouraging Industrial Education participation. Over 45% of the responding students disagreed or strongly disagreed with this item. Means near or below 3.0 item mean for this item suggest the need for help from counselors.

CONCLUSION

You should now have a good idea about using this survey. If you have any questions about it or what data processing or other interpretative assistance, please contact the Center for Vocational, Technical and Adult Education, 225 Applied Arts Building, UW-Stout, Menomonie, WI 54751. You can also contact us by calling (715) 232-1382. Thank you and good luck.

APPENDIX B

DATA ANALYSES RESULTS

(Reproductions of Selected Computer Output)

Part One - Likert Analyses of Survey Two (69 Items)

Part Two - Likert Analysis of 35 Items Selected From Survey Two For Use in Survey Three.

Part Three - One-Way Analyses of Variance By School For Total Score, Attitude Score, and Impact Score. (Three sheets, Group 0 is composed of two deleted individuals, explanatory notation is hand printed to distinguish it from computer output, explanatory)

Part Four - One-Way Analysis of Variance By Sex (Males vs. Females) For Total Score, Attitude Score and Impact Score. (Three sheets, Group 0 is composed of two deleted individuals, explanatory notation is hand printed to distinguish it from computer output, explanatory)

Part Five - Two-Way Analyses of Variance By School and Sex for Total Score, Attitude Score and Impact Score (Three sheets, distinguish it from Computer Output, explanatory notation is hand printed, hand entered asterisks in the bottom quarter of each sheet of part five mark the computer overruns that necessitated the computations presented in part six)

Part Six - Known Value T-test. These tests confirmed that males scored higher than females on Impacts, Attitudes and toal survey scores at a level of significance beyond the 0.01 level. These tests confirmed results of part five.

Part Seven -A Pearson product - moment Correlation Coefficient that indicated positive interaction between the Impact and Attitude sections of the survey.

ITEM	MEAN	STAN-DEV	MEDIAN	P-COR	0	1	2	3	4	5	6	7
1*	4.48	0.86	4.65	-0.016	0.01	0.01	0.01	0.06	0.33	0.58	0.00	
	Q1=4.00	Q3=5.00	IQR=1.07		3	7	6	35	191	334	2	
2*	2.88	1.35	2.81	0.230	0.01	0.19	0.25	0.18	0.23	0.14		
	Q1=1.72	Q3=4.04	IQR=2.32		7	111	143	102	135	81		
3	3.76	0.90	3.85	0.344	0.02	0.02	0.07	0.24	0.47	0.19		
	Q1=3.17	Q3=4.38	IQR=1.21		10	10	38	141	270	110		
4*	1.69	0.99	1.40	0.504	0.01	0.55	0.30	0.07	0.04	0.03		
	Q1=0.95	Q3=2.15	IQR=1.20		6	318	173	40	24	18		
5	2.88	1.21	2.91	0.234	0.01	0.17	0.19	0.34	0.19	0.11		
	Q1=1.93	Q3=3.75	IQR=1.82		6	96	110	197	109	61		
6	3.01	1.07	3.04	0.245	0.02	0.10	0.17	0.40	0.22	0.09		
	Q1=2.34	Q3=3.76	IQR=1.42		13	59	98	234	127	48		
7	2.27	1.13	2.21	0.363	0.01	0.33	0.23	0.30	0.09	0.04		
	Q1=1.26	Q3=3.10	IQR=1.84		7	189	136	173	52	22		
8	4.40	0.88	4.63	0.384	0.01	0.02	0.03	0.05	0.32	0.57		
	Q1=3.95	Q3=5.06	IQR=1.11		5	12	16	31	187	328		
9	3.66	0.90	3.73	0.460	0.01	0.02	0.08	0.30	0.42	0.17		
	Q1=3.01	Q3=4.32	IQR=1.32		8	9	44	175	245	98		
10	3.29	1.11	3.21	0.294	0.01	0.07	0.13	0.41	0.20	0.18		
	Q1=2.62	Q3=4.15	IQR=1.53		8	39	75	240	114	103		
11	3.80	1.07	3.97	0.410	0.01	0.03	0.12	0.15	0.41	0.28		
	Q1=3.14	Q3=4.62	IQR=1.48		7	15	72	88	235	162		
12*	2.67	1.20	2.65	0.237	0.01	0.20	0.25	0.28	0.18	0.07		
	Q1=1.69	Q3=3.54	IQR=1.86		6	116	146	163	106	42		
13	3.06	0.86	3.05	0.350	0.01	0.05	0.12	0.59	0.17	0.06		
	Q1=2.62	Q3=3.47	IQR=0.84		6	30	71	340	97	35		
14	4.04	0.87	4.11	0.572	0.01	0.01	0.03	0.21	0.40	0.34		
	Q1=3.50	Q3=4.77	IQR=1.26		5	5	19	120	233	197		
15	3.17	1.12	3.16	0.309	0.01	0.08	0.17	0.37	0.24	0.13		
	Q1=2.48	Q3=4.01	IQR=1.53		6	49	96	215	137	76		
16	3.38	0.89	3.31	0.439	0.01	0.03	0.08	0.48	0.29	0.11		
	Q1=2.80	Q3=4.03	IQR=1.24		5	17	44	279	170	64		

ITEM	MEAN	STAN-DEV	MEDIAN	P-COR	0	1	2	3	4	5	6	7
17	4.41	0.74	4.55	0.500	0.01	0.01	0.02	0.05	0.39	0.52		
	Q1=3.93	Q3=5.03	IQR=1.09		4	4	11	31	226	303		
18	2.93	1.19	2.90	0.338	0.01	0.12	0.26	0.29	0.21	0.11		
	Q1=1.99	Q3=3.84	IQR=1.86		5	71	149	169	121	64		
19	2.97	1.24	2.91	0.315	0.01	0.12	0.27	0.26	0.20	0.14		
	Q1=1.97	Q3=3.96	IQR=1.99		7	70	154	152	115	81		
20*	2.30	1.19	2.07	0.274	0.01	0.27	0.40	0.15	0.09	0.08		
	Q1=1.41	Q3=3.00	IQR=1.59		5	157	229	89	55	44		
21	3.01	1.18	3.05	0.030	0.02	0.11	0.24	0.25	0.28	0.09		
	Q1=2.05	Q3=3.97	IQR=1.91		13	65	138	145	163	55		
22	3.99	0.99	4.11	0.592	0.02	0.02	0.03	0.27	0.28	0.38		
	Q1=3.21	Q3=4.86	IQR=1.64		9	13	16	159	160	222		
23	3.81	1.28	4.15	0.549	0.02	0.07	0.11	0.18	0.20	0.42		
	Q1=2.87	Q3=4.92	IQR=2.04		11	38	64	107	116	243		
24	3.97	0.99	4.09	0.593	0.01	0.02	0.03	0.26	0.30	0.37		
	Q1=3.23	Q3=4.83	IQR=1.60		5	13	20	151	175	215		
25	3.05	1.25	3.08	0.377	0.01	0.13	0.22	0.25	0.25	0.14		
	Q1=2.03	Q3=4.07	IQR=2.04		6	76	126	146	143	82		
26	3.55	1.19	3.47	0.196	0.01	0.04	0.12	0.35	0.23	0.25	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00							
	Q1=2.76	Q3=4.52	IQR=1.77		7	25	67	200	134	145	0	0
0	0	0	0	0	1							
27	3.28	1.11	3.21	0.326	0.01	0.08	0.11	0.44	0.20	0.17		
	Q1=2.64	Q3=4.10	IQR=1.46		6	44	63	254	115	97		
28	4.40	0.82	4.58	0.555	0.01	0.02	0.02	0.05	0.36	0.54		
	Q1=3.94	Q3=5.04	IQR=1.10		8	11	9	30	209	312		
29*	3.95	1.13	4.18	0.233	0.01	0.04	0.09	0.11	0.36	0.38		
	Q1=3.50	Q3=4.84	IQR=1.34		7	26	53	64	211	218		
30	3.95	0.96	4.07	0.439	0.01	0.02	0.07	0.14	0.46	0.29		
	Q1=3.53	Q3=4.65	IQR=1.12		7	14	38	82	269	169		
31*	2.06	1.05	1.91	0.565	0.01	0.38	0.27	0.26	0.04	0.03		
	Q1=1.15	Q3=2.84	IQR=1.69		6	221	158	151	26	17		
32	4.13	0.82	4.19	0.605	0.01	0.01	0.03	0.14	0.47	0.35		
	Q1=3.66	Q3=4.79	IQR=1.13		5	6	15	79	271	203		

ITEM	MEAN	STAN-DEV	MEDIAN	P-COR	0	1	2	3	4	5	6	7
33*	1.81	1.05	1.46	0.447	0.01	0.52	0.25	0.16	0.03	0.03		
	Q1=0.98	Q3=2.41	IQR=1.43		4	300	144	91	20	20		
34	3.71	1.06	3.79	0.521	0.01	0.03	0.09	0.28	0.32	0.27		
	Q1=2.94	Q3=4.58	IQR=1.64		6	18	54	162	183	156		
35*	2.42	0.98	2.38	0.437	0.01	0.18	0.36	0.34	0.09	0.03		
	Q1=1.68	Q3=3.11	IQR=1.43		4	106	207	194	52	16		
36*	2.80	1.25	2.77	0.310	0.01	0.18	0.25	0.22	0.25	0.28		
	Q1=1.75	Q3=3.85	IQR=2.10		7	107	145	126	146	48		
37	3.77	0.94	3.81	0.521	0.01	0.03	0.03	0.32	0.37	0.24		
	Q1=3.09	Q3=4.47	IQR=1.38		5	15	19	187	216	137		
38	3.71	0.80	3.66	0.568	0.02	0.01	0.01	0.41	0.37	0.18		
	Q1=3.05	Q3=4.31	IQR=1.27		10	5	8	237	217	102		
39	4.22	1.01	4.49	0.469	0.02	0.03	0.05	0.07	0.34	0.49		
	Q1=3.78	Q3=5.00	IQR=1.22		13	18	31	38	198	281		
40	4.12	0.84	4.19	0.719	0.02	0.01	0.02	0.18	0.41	0.37		
	Q1=3.59	Q3=4.83	IQR=1.24		11	6	9	106	235	212		
41*	2.41	1.12	2.30	0.304	0.02	0.24	0.31	0.27	0.11	0.05		
	Q1=1.52	Q3=3.18	IQR=1.66		11	138	182	155	65	28		
42	3.24	1.11	3.18	0.393	0.02	0.07	0.14	0.40	0.20	0.16		
	Q1=2.58	Q3=4.07	IQR=1.50		13	41	83	233	118	91		
43	2.62	1.13	2.57	0.259	0.02	0.18	0.29	0.30	0.15	0.06		
	Q1=1.73	Q3=3.38	IQR=1.65		11	103	169	175	84	37		
44	3.43	1.11	3.60	0.590	0.03	0.05	0.18	0.23	0.36	0.16		
	Q1=2.59	Q3=4.28	IQR=1.69		17	27	102	131	208	94		
45*	3.65	1.22	3.91	0.527	0.03	0.06	0.15	0.12	0.36	0.27		
	Q1=2.73	Q3=4.61	IQR=1.88		15	36	89	71	210	158		
46*	3.42	1.12	3.66	0.499	0.03	0.07	0.13	0.21	0.41	0.14		
	Q1=2.68	Q3=4.25	IQR=1.57		16	42	77	124	240	80		
47	3.50	0.85	3.36	0.031	0.98	0.00	0.00	0.01	0.01	0.00		
	Q1=2.86	Q3=4.13	IQR=1.27		565	0	1	7	4	2		
48	2.83	1.07	2.86	0.197	0.02	0.12	0.22	0.40	0.17	0.07		
	Q1=2.05	Q3=3.48	IQR=1.43		14	70	129	229	99	38		

ITEM	MEAN	STAN-DEV	MEDIAN	P-COR	0	1	2	3	4	5	6	7
49	4.17	0.88	4.28	0.701	0.02	0.01	0.01	0.09	0.41	0.39		
	Q1=3.72	Q3=4.88	IQR=1.16		13	8	26	53	252	227		
50*	2.52	1.12	2.29	0.448	0.03	0.16	0.41	0.22	0.11	0.09		
	Q1=1.71	Q3=3.23	IQR=1.52		18	90	240	129	62	44		
51	3.82	0.99	3.88	0.614	0.02	0.03	0.03	0.32	0.34	0.29		
	Q1=3.11	Q3=4.63	IQR=1.52		12	17	20	172	195	163		
52	3.76	1.03	3.92	0.623	0.03	0.03	0.10	0.17	0.43	0.23		
	Q1=3.15	Q3=4.48	IQR=1.33		18	19	56	100	250	136		
53	3.24	0.92	3.18	0.482	0.03	0.04	0.11	0.19	0.23	0.09		
	Q1=2.69	Q3=3.87	IQR=1.18		19	23	63	284	135	55		
54*	1.97	1.11	1.73	0.481	0.03	0.40	0.37	0.08	0.07	0.05		
	Q1=1.11	Q3=2.39	IQR=1.28		17	231	214	49	40	28		
55	3.99	0.96	4.11	0.441	0.03	0.02	0.05	0.20	0.35	0.35		
	Q1=3.36	Q3=4.80	IQR=1.44		17	9	30	118	203	202		
56	3.75	1.05	3.82	0.487	0.03	0.03	0.08	0.28	0.30	0.28		
	Q1=2.98	Q3=4.64	IQR=1.66		15	15	49	162	174	164		
57	3.86	1.05	4.01	0.648	0.03	0.02	0.11	0.18	0.36	0.31		
	Q1=3.17	Q3=4.72	IQR=1.55		15	11	62	102	209	180		
58	3.66	1.00	3.64	0.463	0.03	0.02	0.07	0.35	0.30	0.23		
	Q1=2.92	Q3=4.46	IQR=1.54		16	14	43	200	172	134		
59	4.43	0.68	4.51	0.634	0.02	0.01	0.00	0.03	0.44	0.49		
	Q1=3.95	Q3=5.00	IQR=1.05		14	6	2	18	255	284		
60	3.24	1.26	3.31	0.486	0.03	0.11	0.17	0.26	0.25	0.19		
	Q1=2.30	Q3=4.27	IQR=1.97		15	64	96	150	146	108		
61	3.89	0.97	3.96	0.667	0.03	0.02	0.05	0.27	0.33	0.31		
	Q1=3.16	Q3=4.71	IQR=1.55		15	9	30	155	191	179		
62	3.48	1.00	3.62	0.594	0.03	0.03	0.15	0.27	0.40	0.14		
	Q1=2.76	Q3=4.23	IQR=1.47		16	16	85	154	229	79		
63	3.39	0.85	3.28	0.551	0.03	0.02	0.05	0.53	0.26	0.11		
	Q1=2.82	Q3=3.99	IQR=1.17		16	14	29	306	151	63		
64	3.23	1.10	3.20	0.544	0.03	0.07	0.13	0.40	0.22	0.14		
	Q1=2.60	Q3=4.05	IQR=1.45		17	43	75	234	127	83		

ITEM	MEAN	STAN-DEV	MEDIAN	P-COR	0	1	2	3	4	5	6	7
65	3.89	1.09	4.05	0.415	0.03	0.03	0.07	0.23	0.28	0.36		
	Q1=3.10	Q3=4.83	IQR=1.72		15	19	41	134	161	209		
66	4.25	0.87	4.43	0.622	0.02	0.01	0.03	0.14	0.33	0.46		
	Q1=3.70	Q3=4.97	IQR=1.28		14	5	16	82	193	269		
67	4.12	0.83	4.18	0.568	0.03	0.01	0.03	0.15	0.44	0.35		
	Q1=3.63	Q3=4.80	IQR=1.17		16	5	15	87	255	201		
68*	1.89	1.12	1.50	0.546	0.03	0.49	0.25	0.13	0.07	0.04		
	Q1=1.00	Q3=2.47	IQR=1.47		16	281	146	73	41	22		
69	3.45	1.11	3.37	0.358	0.03	0.06	0.09	0.38	0.23	0.21		
	Q1=2.73	Q3=4.35	IQR=1.62		18	34	55	220	131	121		

TEST RELIABILITY

SOURCE	DF	SS	M.S.
AMONG INDIVIDUALS	578	9540.3100	16.50570
AMONG ITEMS	68	18897.7000	277.90800
RESIDUAL	39304	41864.7000	1.06515
TOTAL	39950	70302.7000	1.75977

HOYT'S RELIABILITY= 0.94 SPEARMAN-BROWN RELIABILITY= 0.94
STANDARD ERROR OF MEASUREMENT= 0.5729
MEAN SCORE= 237.96 STANDARD DEVIATION= 33.75
AVERAGE RESPONSE= 3.45 03-AUG-78 12:19 AM
COMPOSITE MEAN= 3.39 COMPOSITE STD= 1.26
TERMINAL TIME 0 HOURS 1 MINUTES. CPU TIME 3 MINUTES 53 SECONDS.

TEM	MEAN	STAN-DEV	MEDIAN	P-COR	0	1	2	3	4	5	6	7
4*	1.69	0.99	1.40	0.529	0.01	0.55	0.30	0.07	0.04	0.03		
	Q1=0.95	Q3=2.15	IQR=1.20		6	318	173	40	24	18		
11	3.80	1.07	3.97	0.320	0.01	0.03	0.12	0.15	0.41	0.28		
	Q1=3.14	Q3=4.62	IQR=1.48		7	15	72	88	235	162		
14	4.04	0.87	4.11	0.591	0.01	0.01	0.03	0.21	0.40	0.34		
	Q1=3.50	Q3=4.77	IQR=1.28		5	5	19	120	233	197		
17	4.41	0.74	4.55	0.470	0.01	0.01	0.02	0.05	0.39	0.52		
	Q1=3.93	Q3=5.03	IQR=1.09		4	4	11	31	226	303		
22	3.99	0.99	4.11	0.636	0.02	0.02	0.03	0.27	0.28	0.38		
	Q1=3.21	Q3=4.86	IQR=1.64		9	13	16	159	160	222		
23	3.81	1.28	4.15	0.586	0.02	0.07	0.11	0.18	0.20	0.42		
	Q1=2.87	Q3=4.92	IQR=2.04		11	38	64	107	116	243		
25	3.05	1.25	3.08	0.415	0.01	0.13	0.22	0.25	0.25	0.14		
	Q1=2.03	Q3=4.07	IQR=2.04		6	76	126	146	143	82		
28	4.40	0.82	4.58	0.555	0.01	0.02	0.02	0.05	0.36	0.54		
	Q1=3.94	Q3=5.04	IQR=1.10		8	11	9	30	209	312		
31*	2.06	1.05	1.91	0.603	0.01	0.38	0.27	0.26	0.04	0.03		
	Q1=1.15	Q3=2.84	IQR=1.69		6	221	158	151	26	17		
33*	1.81	1.05	1.46	0.482	0.01	0.52	0.25	0.16	0.03	0.03		
	Q1=0.98	Q3=2.41	IQR=1.43		4	300	144	91	20	20		
34	3.71	1.06	3.79	0.562	0.01	0.03	0.09	0.28	0.32	0.27		
	Q1=2.94	Q3=4.58	IQR=1.64		6	18	54	162	183	156		
35*	2.42	0.98	2.38	0.460	0.01	0.18	0.36	0.34	0.09	0.03		
	Q1=1.68	Q3=3.11	IQR=1.43		4	106	207	194	52	16		
38	3.71	0.80	3.66	0.565	0.02	0.01	0.01	0.41	0.37	0.18		
	Q1=3.05	Q3=4.31	IQR=1.27		10	5	8	237	217	102		
39	4.22	1.01	4.49	0.473	0.02	0.03	0.05	0.07	0.34	0.49		
	Q1=3.78	Q3=5.00	IQR=1.22		13	18	31	38	198	281		
40	4.12	0.84	4.19	0.751	0.02	0.01	0.02	0.18	0.41	0.37		
	Q1=3.59	Q3=4.83	IQR=1.24		11	6	9	106	235	212		
43	2.62	1.13	2.57	0.269	0.02	0.18	0.29	0.30	0.15	0.06		
	Q1=1.73	Q3=3.38	IQR=1.65		11	103	169	175	84	37		

ITEM	MEAN	STAN-DEV	MEDIAN	P-COR	0	1	2	3	4	5	6	7
44	3.43	1.11	3.60	0.651	0.03	0.05	0.18	0.23	2.36	0.16		
	Q1=2.59	Q3=4.28	IQR=1.69		17	27	102	131	228	94		
45	3.65	1.22	3.91	0.571	0.03	0.06	0.15	0.12	0.36	0.27		
	Q1=2.73	Q3=4.61	IQR=1.88		15	36	89	71	210	158		
49	4.17	0.88	4.28	0.737	0.02	0.01	0.04	0.09	0.44	0.39		
	Q1=3.72	Q3=4.88	IQR=1.16		13	8	26	53	252	227		
50*	2.52	1.12	2.29	0.523	0.03	0.16	0.41	0.22	0.11	0.09		
	Q1=1.71	Q3=3.23	IQR=1.52		18	90	240	125	62	44		
51	3.82	0.99	3.88	0.630	0.02	0.03	0.03	0.30	0.34	0.28		
	Q1=3.11	Q3=4.63	IQR=1.52		12	17	20	172	195	163		
52	3.76	1.03	3.92	0.669	0.03	0.03	0.10	0.17	0.43	0.23		
	Q1=3.15	Q3=4.48	IQR=1.33		18	19	56	100	250	136		
53	3.24	0.92	3.18	0.445	0.03	0.04	0.11	0.49	0.23	0.09		
	Q1=2.69	Q3=3.87	IQR=1.18		19	23	63	284	135	55		
54*	1.97	1.11	1.73	0.548	0.03	0.40	0.37	0.08	0.07	0.05		
	Q1=1.11	Q3=2.39	IQR=1.28		17	231	214	49	40	28		
55	3.99	0.96	4.11	0.440	0.03	0.02	0.05	0.20	0.35	0.35		
	Q1=3.36	Q3=4.80	IQR=1.44		17	9	30	118	203	202		
57	3.86	1.05	4.01	0.686	0.03	0.02	0.11	0.18	0.36	0.31		
	Q1=3.17	Q3=4.72	IQR=1.55		15	11	62	102	209	180		
59	4.43	0.68	4.51	0.636	0.02	0.01	0.00	0.03	0.44	0.49		
	Q1=3.95	Q3=5.00	IQR=1.05		14	6	2	18	255	284		
60	3.24	1.26	3.31	0.493	0.03	0.11	0.17	0.26	0.25	0.19		
	Q1=2.30	Q3=4.27	IQR=1.97		15	64	96	150	146	108		
61	3.89	0.97	3.96	0.713	0.03	0.02	0.05	0.27	0.33	0.31		
	Q1=3.16	Q3=4.71	IQR=1.55		15	9	30	155	191	179		
62	3.48	1.00	3.62	0.636	0.03	0.03	0.15	0.27	0.40	0.14		
	Q1=2.76	Q3=4.23	IQR=1.47		16	16	85	154	229	79		
64	3.23	1.10	3.20	0.585	0.03	0.07	0.13	0.40	0.22	0.14		
	Q1=2.60	Q3=4.05	IQR=1.45		17	43	75	234	127	83		
66	4.25	0.87	4.43	0.634	0.02	0.01	0.03	0.14	0.33	0.46		
	Q1=3.70	Q3=4.97	IQR=1.28		14	5	16	82	193	269		

ITEM	MEAN	STAN-DEV	MEDIAN	P-COR	0	1	2	3	4	5	6	7
37	4.12	0.83	4.18	0.576	0.03	0.01	0.03	0.15	0.44	0.35		
	Q1=3.63	Q3=4.80	IQR=1.17		16	5	15	87	255	201		
38*	1.89	1.12	1.56	0.584	0.03	0.49	0.25	0.13	0.07	0.04		
	Q1=1.00	Q3=2.47	IQR=1.47		16	281	146	73	41	22		

TEST RELIABILITY

SOURCE	DF	SS	M.S.
MONG INDIVIDUALS	578	7864.6900	13.60670
MONG ITEMS	33	3409.2500	103.31100
RESIDUAL	19074	17726.4000	0.92935
TOTAL	19685	29000.3000	1.47322

COYT'S RELIABILITY= 0.93 SPEARMAN-BROWN RELIABILITY 0.94
STANDARD ERROR OF MEASUREMENT= 5.6212
MEAN SCORE= 127.46 STANDARD DEVIATION= 21.51
AVERAGE RESPONSE= 3.75 14-Aug-78 12:42 PM
COMPOSITE MEAN= 3.44 COMPOSITE STD= 1.30
TERMINAL TIME 0 HOURS 0 MINUTES. CPU TIME 2 MINUTES 13 SECONDS.

```
 ANALYSIS OF VARIANCE -- RANDOMIZED ONE-WAY DESIGN **
NTER FOR RESEARCH AND EDUCATIONAL IMROVEMENT, UW-STOUT, ON 31-Jul-78
OGRAM: ANOVA1, DATA FROM FILE 'DK1:WAT308' USED ON THIS ANALYSIS
OUP BREAKDOWN DATA FROM COLUMN # 2 , DATA FROM COLUMN # 3
```

TOTAL
BY SCHOOL

ANALYSIS OF VARIANCE TABLE

```
ANDOM TOTAL= 139240 , TOTAL NUMBER OF OBSERVATIONS= 579 , MEAN= 240.484

 SOURCE          SS          DF          MS

REATMENTS     22492.00         6        3748.67
RROR         381706.00       572         667.32
-------------------------------------------------
OTAL         404198.00       578

 = 5.61751  ON 6 AND 572 DEGREES OF FREEDOM.
HE EXACT PROB. OF F= 5.61751  WITH ( 6 , 572 ) D.F. IS  .00005
    THIS IS SIGNIFICANT AT THE .01 LEVEL
HE MEAN FOR GROUP  0 IS      259.50 THE STD IS     13.44  N=   2
HE MEAN FOR GROUP  1 IS     -230.96 THE STD IS     24.50  N=  68
HE MEAN FOR GROUP  2 IS      249.68 THE STD IS     28.01  N= 126
HE MEAN FOR GROUP  3 IS      238.89 THE STD IS     23.97  N=  75
HE MEAN FOR GROUP  4 IS      235.62 THE STD IS     23.15  N=  97
HE MEAN FOR GROUP  5 IS      244.88 THE STD IS     22.91  N=  84
HE MEAN FOR GROUP  6 IS      237.91 THE STD IS     28.96  N= 127
```

```
CHEFFE'S POST-HOC COMPARISON
NTER THE F( .01 ) VALUE FOR  6 AND 572 DEGREES OF FREEDOM? 1.77

ANKING OF THE MEANS

EAN 2  IS SIGNIFICANTLY GREATER THAN MEAN 4 ' 1
EAN 5  IS SIGNIFICANTLY GREATER THAN MEAN 1
```

```
** ANALYSIS OF VARIANCE -- RANDOMIZED ONE-WAY DESIGN **
CENTER FOR RESEARCH AND EDUCATIONAL IMROVEMENT, UW-STOUT, ON 31-Jul-78
PROGRAM: ANOVA1, DATA FROM FILE 'DK1:WAT308' USED ON THIS ANALYSIS
GROUP BREAKDOWN DATA FROM COLUMN # 2 , DATA FROM COLUMN # 4
```

ATTITUDE
BY SCHOOL

ANALYSIS OF VARIANCE TABLE

GRAND TOTAL= 86776 , TOTAL NUMBER OF OBSERVATIONS= 579 , MEAN= 149.872

SOURCE	SS	DF	MS
TREATMENTS	12856.00	6	2142.67
ERROR	147655.00	572	258.14
TOTAL	160511.00	578	

F = 8.30047 ON 6 AND 572 DEGREES OF FREEDOM.
THE EXACT PROB. OF F= 8.30047 WITH (6 , 572) D.F. IS 0
THIS IS SIGNIFICANT AT THE .01 LEVEL

THE MEAN FOR GROUP 0 IS	164.00	THE STD IS	14.14	N=	2
THE MEAN FOR GROUP 1 IS	141.75	THE STD IS	15.34	N=	68
THE MEAN FOR GROUP 2 IS	155.64	THE STD IS	18.12	N=	126
THE MEAN FOR GROUP 3 IS	149.31	THE STD IS	14.44	N=	75
THE MEAN FOR GROUP 4 IS	145.63	THE STD IS	13.70	N=	97
THE MEAN FOR GROUP 5 IS	154.57	THE STD IS	15.83	N=	84
THE MEAN FOR GROUP 6 IS	148.75	THE STD IS	17.00	N=	127

SCHEFFE'S POST-HOC COMPARISON
ENTER THE F(.01) VALUE FOR 6 AND 572 DEGREES OF FREEDOM? 1.77

RANKING OF THE MEANS

MEAN 2 IS SIGNIFICANTLY GREATER THAN MEAN 4 1
MEAN 5 IS SIGNIFICANTLY GREATER THAN MEAN 4 1

```
** ANALYSIS OF VARIANCE -- RANDOMIZED ONE-WAY DESIGN **
CENTER FOR RESEARCH AND EDUCATIONAL IMROVEMENT, UW-STOUT, ON 31-Jul-78
PROGRAM: ANOVA1, DATA FROM FILE 'DK1:WAT308' USED ON THIS ANALYSIS
GROUP BREAKDOWN DATA FROM COLUMN # 2 , DATA FROM COLUMN # 5
```

IMPACT
BY SCHOOL

ANALYSIS OF VARIANCE TABLE

GRAND TOTAL= 45930 , TOTAL NUMBER OF OBSERVATIONS= 579 , MEAN= 79.3264

SOURCE	SS	DF	MS
TREATMENTS	2002.75	6	333.79
ERROR	67830.50	572	118.59
TOTAL	69833.30	578	

F = 2.81479 ON 6 AND 572 DEGREES OF FREEDOM.
THE EXACT PROB. OF F= 2.81479 WITH (6 , 572) D.F. IS .01056
THIS IS SIGNIFICANT AT THE .05 LEVEL

THE MEAN FOR GROUP 0 IS	84.50	THE STD IS	2.12	N=	2
THE MEAN FOR GROUP 1 IS	77.57	THE STD IS	9.97	N=	68
THE MEAN FOR GROUP 2 IS	82.48	THE STD IS	10.39	N=	126
THE MEAN FOR GROUP 3 IS	77.77	THE STD IS	10.36	N=	75
THE MEAN FOR GROUP 4 IS	78.40	THE STD IS	10.22	N=	97
THE MEAN FOR GROUP 5 IS	80.12	THE STD IS	10.99	N=	84
THE MEAN FOR GROUP 6 IS	78.16	THE STD IS	12.50	N=	127

SCHEFFE'S POST-HOC COMPARISON
ENTER THE F(.05) VALUE FOR 6 AND 572 DEGREES OF FREEDOM? 1.72

RANKING OF THE MEANS

```
** ANALYSIS OF VARIANCE -- RANDOMIZED ONE-WAY DESIGN **
CENTER FOR RESEARCH AND EDUCATIONAL IMROVEMENT, UW-STOUT, ON 31-Jul-78
PROGRAM: ANOVA1, DATA FROM FILE 'DK1:WAT308' USED ON THIS ANALYSIS
GROUP BREAKDOWN DATA FROM COLUMN # 1 , DATA FROM COLUMN # 3
```

TOTAL

MALE = GROUP 1, FEMALE = GROUP 2

ANALYSIS OF VARIANCE TABLE

GRAND TOTAL= 139240 , TOTAL NUMBER OF OBSERVATIONS= 579 , MEAN= 240.484

SOURCE	SS	DF	MS
TREATMENTS	23246.00	2	11623.00
ERROR	380980.00	576	661.42
TOTAL	404226.00	578	

F = 17.5727 ON 2 AND 576 DEGREES OF FREEDOM.
THE EXACT PROB. OF F= 17.5727 WITH (2 , 576) D.F. IS 0
THIS IS SIGNIFICANT AT THE .01 LEVEL

THE MEAN FOR GROUP 0 IS	258.50	THE STD IS	43.13	N= 2
THE MEAN FOR GROUP 1 IS	245.85	THE STD IS	26.83	N= 329
THE MEAN FOR GROUP 2 IS	233.21	THE STD IS	24.05	N= 248

```
SCHEFFE'S POST-HOC COMPARISON
ENTER THE F( .01 ) VALUE FOR  2 AND 576 DEGREES OF FREEDOM? 2.3

RANKING OF THE MEANS

MEAN 1  IS SIGNIFICANTLY GREATER THAN MEAN 2
```

** ANALYSIS OF VARIANCE -- RANDOMIZED ONE-WAY DESIGN **
CENTER FOR RESEARCH AND EDUCATIONAL IMROVEMENT, UW-STOUT, ON 31-Jul-78
PROGRAM: ANOVA1, DATA FROM FILE 'DK1:WAT308' USED ON THIS ANALYSIS
GROUP BREAKDOWN DATA FROM COLUMN # 1 , DATA FROM COLUMN # 4

ATTITUDE
FEMALE = 2, MALE = 1

ANALYSIS OF VARIANCE TABLE

GRAND TOTAL= 86776 , TOTAL NUMBER OF OBSERVATIONS= 579 , MEAN= 149.872

SOURCE	SS	DF	MS
TREATMENTS	11442.00	2	5721.00
ERROR	149069.00	576	258.80
TOTAL	160511.00	578	

F = 22.1058 ON 2 AND 576 DEGREES OF FREEDOM.
THE EXACT PROB. OF F= 22.1058 WITH (2 , 576) D.F. IS 0
THIS IS SIGNIFICANT AT THE .01 LEVEL
THE MEAN FOR GROUP 0 IS 197.00 THE STD IS 7.07 N= 2
THE MEAN FOR GROUP 1 IS 152.73 THE STD IS 16.50 N= 329
THE MEAN FOR GROUP 2 IS 145.70 THE STD IS 15.55 N= 248

SCHEFFE'S POST-HOC COMPARISON
ENTER THE F(.01) VALUE FOR 2 AND 576 DEGREES OF FREEDOM? 2.3

RANKING OF THE MEANS

~~MEAN 0 IS SIGNIFICANTLY GREATER THAN MEAN 1~~
MEAN 1 IS SIGNIFICANTLY GREATER THAN MEAN 2

```
** ANALYSIS OF VARIANCE -- RANDOMIZED ONE-WAY DESIGN **
CENTER FOR RESEARCH AND EDUCATIONAL IMROVEMENT, UW-STOUT, ON 31-Jul-78
PROGRAM: ANOVA1, DATA FROM FILE 'DK1:WAT308' USED ON THIS ANALYSIS
GROUP BREAKDOWN DATA FROM COLUMN # 1 , DATA FROM COLUMN # 5
```

IMPACTS

MALE = 1, FEMALE = 2

ANALYSIS OF VARIANCE TABLE

GRAND TOTAL= 45930 , TOTAL NUMBER OF OBSERVATIONS= 579 , MEAN= 79.3264

SOURCE	SS	DF	MS
TREATMENTS	5460.50	2	2730.25
ERROR	64372.80	576	111.76
TOTAL	69833.30	578	

F = 24.43 ON 2 AND 576 DEGREES OF FREEDOM.
THE EXACT PROB. OF F= 24.43 WITH (2 , 576) D.F. IS 0
THIS IS SIGNIFICANT AT THE .01 LEVEL
THE MEAN FOR GROUP 0 IS 53.00 THE STD IS 49.50 N= 2
THE MEAN FOR GROUP 1 IS 81.72 THE STD IS 11.18 N= 329
THE MEAN FOR GROUP 2 IS 76.36 THE STD IS 9.21 N= 248

SCHEFFE'S POST-HOC COMPARISON
ENTER THE F(.01) VALUE FOR 2 AND 576 DEGREES OF FREEDOM? 2.3

RANKING OF THE MEANS

MEAN 1 IS SIGNIFICANTLY GREATER THAN MEAN 0
MEAN 2 IS SIGNIFICANTLY GREATER THAN MEAN 0

```
** ANALYSIS OF VARIANCE -- TWO-WAY DESIGN **
CENTER FOR RESEARCH AND EDUCATIONAL IMPROVEMENT, UW-STOUT, ON 31-Jul-78
PROGRAM: ANOVA2, DATA FROM FILE 'DK1:WAT308' USED ON THIS ANALYSIS
FACTOR 1 GROUP BREAKDOWN FROM COLUMN # 1
FACTOR 2 GROUP BREAKDOWN FROM COLUMN # 2  DATA FROM COLUMN # 3
```

TOTALS

FEMALES = ROW 2 , MALES = ROW 1

SCHOOLS = RESPECTIVE "COLUMN"

MEAN AND STANDARD DEVIATIONS

ROW	1	COLUMN	1	MEAN=	237.36	STD=	23.11	N= 33
ROW	1	COLUMN	2	MEAN=	252.21	STD=	29.34	N= 76
ROW	1	COLUMN	3	MEAN=	244.44	STD=	26.21	N= 36
ROW	1	COLUMN	4	MEAN=	244.92	STD=	25.02	N= 49
ROW	1	COLUMN	5	MEAN=	250.94	STD=	21.49	N= 52
ROW	1	COLUMN	6	MEAN=	241.39	STD=	28.86	N= 83
ROW	1			MEAN=	245.85	STD=	26.83	N= 329
ROW	2	COLUMN	1	MEAN=	224.91	STD=	24.55	N= 35
ROW	2	COLUMN	2	MEAN=	245.82	STD=	25.67	N= 50
ROW	2	COLUMN	3	MEAN=	233.77	STD=	20.74	N= 39
ROW	2	COLUMN	4	MEAN=	226.13	STD=	16.52	N= 48
ROW	2	COLUMN	5	MEAN=	233.47	STD=	20.32	N= 30
ROW	2	COLUMN	6	MEAN=	231.36	STD=	28.32	N= 44
ROW	2			MEAN=	233.00	STD=	24.02	N= 246
COLUMN	1			MEAN=	230.96	STD=	24.50	N= 68
COLUMN	2			MEAN=	249.68	STD=	28.01	N= 126
COLUMN	3			MEAN=	238.89	STD=	23.97	N= 75
COLUMN	4			MEAN=	235.62	STD=	23.15	N= 97
COLUMN	5			MEAN=	244.88	STD=	22.91	N= 84
COLUMN	6			MEAN=	237.91	STD=	28.96	N= 127

TWO FACTOR ANALYSIS OF VARIANCE

	DEGREES OF FREEDOM		SUM OF SQUARES	MEAN SQUARES
BETWEEN ROWS.	1		789774.0000	789774.0000
BETWEEN COLS.	5		% .550283E 7	% .110057E 7
INTERACTION	5	*	%-.19296E 8	*%-.385921E 7
ERROR TERM	567		356028.0000	627.9150
TOTAL	578	*	%-.126474E 8	

SIGNIFICANT OF ROW VARIABLE
F=1257.77 DF= 1 , 567
THE EXACT PROBABILITY IS 0
THIS IS SIGNIFICANT AT THE .01 LEVEL

** ANALYSIS OF VARIANCE -- TWO-WAY DESIGN **
CENTER FOR RESEARCH AND EDUCATIONAL IMPROVEMENT, UW-STOUT, ON 31-Jul-78
PROGRAM: ANOVA2, DATA FROM FILE 'DK1:WAT308' USED ON THIS ANALYSIS
FACTOR 1 GROUP BREAKDOWN FROM COLUMN # 1
FACTOR 2 GROUP BREAKDOWN FROM COLUMN # 2 DATA FROM COLUMN # 4

ATTITUDE

MALES = ROW 1, FEMALES = ROW 2
SCHOOLS = COLUMNS

MEAN AND STANDARD DEVIATIONS

ROW	1	COLUMN	1	MEAN=	145.09	STD=	14.37	N= 33
ROW	1	COLUMN	2	MEAN=	156.68	STD=	19.34	N= 76
ROW	1	COLUMN	3	MEAN=	153.94	STD=	14.47	N= 36
ROW	1	COLUMN	4	MEAN=	150.00	STD=	14.97	N= 49
ROW	1	COLUMN	5	MEAN=	157.62	STD=	13.12	N= 52
ROW	1	COLUMN	6	MEAN=	150.17	STD=	16.54	N= 83
ROW	1			MEAN=	152.73	STD=	16.50	N= 329
ROW	2	COLUMN	1	MEAN=	138.60	STD=	15.76	N= 35
ROW	2	COLUMN	2	MEAN=	154.04	STD=	16.14	N= 50
ROW	2	COLUMN	3	MEAN=	145.03	STD=	13.20	N= 39
ROW	2	COLUMN	4	MEAN=	141.17	STD=	10.68	N= 48
ROW	2	COLUMN	5	MEAN=	146.47	STD=	14.30	N= 30
ROW	2	COLUMN	6	MEAN=	146.07	STD=	17.72	N= 44
ROW	2			MEAN=	145.55	STD=	15.50	N= 246
COLUMN	1			MEAN=	141.75	STD=	15.34	N= 68
COLUMN	2			MEAN=	155.64	STD=	18.12	N= 126
COLUMN	3			MEAN=	149.31	STD=	14.44	N= 75
COLUMN	4			MEAN=	145.63	STD=	13.70	N= 97
COLUMN	5			MEAN=	154.57	STD=	15.83	N= 84
COLUMN	6			MEAN=	148.75	STD=	17.00	N= 127

TWO FACTOR ANALYSIS OF VARIANCE

	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARES
BETWEEN ROWS.	1	328576.0000	328576.0000
BETWEEN COLS.	5	* X .439627E 7	879254.0000
INTERACTION	5	* X-.984601E 7	* X-.19692E 7
ERROR TERM	567	136561.0000	240.8480
TOTAL	578	* X-.49846E 7	

SIGNIFICANT OF ROW VARIABLE
F=1364.25 DF= 1 , 567
THE EXACT PROBABILITY IS 0
THIS IS SIGNIFICANT AT THE .01 LEVEL

```
** ANALYSIS OF VARIANCE -- TWO WAY DESIGN **
CENTER FOR RESEARCH AND EDUCATIONAL IMPROVEMENT, UW-STOUT, ON 31-Jul-78
PROGRAM: ANOVA2, DATA FROM FILE 'DK1:WAT308' USED ON THIS ANALYSIS
FACTOR 1 GROUP BREAKDOWN FROM COLUMN # 1
FACTOR 2 GROUP BREAKDOWN FROM COLUMN # 2  DATA FROM COLUMN # 5
```

IMPACTS

FEMALES = ROW 2, MALES = ROW 1

SCHOOL = COLUMNS

MEAN AND STANDARD DEVIATIONS

ROW	1	COLUMN	1	MEAN=	80.61	STD= 9.52	N= 33
ROW	1	COLUMN	2	MEAN=	83.84	STD= 10.52	N= 76
ROW	1	COLUMN	3	MEAN=	78.61	STD= 12.56	N= 36
ROW	1	COLUMN	4	MEAN=	82.55	STD= 10.83	N= 49
ROW	1	COLUMN	5	MEAN=	82.75	STD= 9.00	N= 52
ROW	1	COLUMN	6	MEAN=	80.45	STD= 12.85	N= 83
ROW	1			MEAN=	81.72	STD= 11.18	N= 329
ROW	2	COLUMN	1	MEAN=	74.71	STD= 9.66	N= 35
ROW	2	COLUMN	2	MEAN=	80.40	STD= 9.94	N= 50
ROW	2	COLUMN	3	MEAN=	77.00	STD= 7.90	N= 39
ROW	2	COLUMN	4	MEAN=	74.17	STD= 7.58	N= 48
ROW	2	COLUMN	5	MEAN=	77.37	STD= 6.91	N= 30
ROW	2	COLUMN	6	MEAN=	73.84	STD= 10.66	N= 44
ROW	2			MEAN=	76.29	STD= 9.22	N= 246
COLUMN	1			MEAN=	77.57	STD= 9.97	N= 68
COLUMN	2			MEAN=	82.48	STD= 10.39	N= 126
COLUMN	3			MEAN=	77.77	STD= 10.36	N= 75
COLUMN	4			MEAN=	78.40	STD= 10.22	N= 97
COLUMN	5			MEAN=	80.12	STD= 10.99	N= 84
COLUMN	6			MEAN=	78.16	STD= 12.50	N= 127

TWO FACTOR ANALYSIS OF VARIANCE

	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARES
BETWEEN ROWS.	1	76220.7000	76220.7000
BETWEEN COLS.	5	* %-309188	* -61837.6000
INTERACTION	5	* %-.116157E 7	* %-232314
ERROR TERM	567	59363.6000	* 104.6980
TOTAL	578	* %-.133518E 7	

SIGNIFICANT OF ROW VARIABLE
F= 728.01 DF= 1 , 567
THE EXACT PROBABILITY IS 0
THIS IS SIGNIFICANT AT THE .01 LEVEL

```
Ready

RUN
KVTTST  08:14 PM        12-Aug-78
HOW MANY T TEST RUNS DO YOU NEED? 11
WHAT IS THE MEAN FOR GROUP 1? 81.72
WHAT IS THE NUMBER OF SCORES IN GROUP 1? 329
WHAT IS THE STANDARD DEVIATION FOR GROUP 1? 11.18
WHAT IS THE MEAN FOR GROUP 2? 76.29
WHAT IS THE NUMBER OF SCORES IN GROUP 2? 246
WHAT IS THE STANDARD DEVIATION FOR GROUP 2? 9.22
PLEASE INPUT YOUR HEADING NEXT
? SEX 1=MALE  2=FEMALE
```

```
                SEX 1=MALE  2=FEMALE

THE T TEST SCORE IS  4.50915

GROUP 1 IS LARGER THAN GROUP 2
```

IMPACTS – SEX (♀ VS ♂)

```
KVTTST  08:16 PM        12-Aug-78
HOW MANY T TEST RUNS DO YOU NEED? 1
WHAT IS THE MEAN FOR GROUP 1? 152.17
WHAT IS THE NUMBER OF SCORES IN GROUP 1? 329
WHAT IS THE STANDARD DEVIATION FOR GROUP 1? 16.50
WHAT IS THE MEAN FOR GROUP 2? 145.55
WHAT IS THE NUMBER OF SCORES IN GROUP 2? 246
WHAT IS THE STANDARD DEVIATION FOR GROUP 2? 17.72
PLEASE INPUT YOUR HEADING NEXT
2
THE T TEST SCORE IS  3.24595

GROUP 1 IS LARGER THAN GROUP 2
```

ATTITUDES – SEX (♀ VS ♂)

```
KVTTST  08:16 PM        12-Aug-78
HOW MANY T TEST RUNS DO YOU NEED? 1
WHAT IS THE MEAN FOR GROUP 1? 245.85
WHAT IS THE NUMBER OF SCORES IN GROUP 1? 329
WHAT IS THE STANDARD DEVIATION FOR GROUP 1? 26.83
WHAT IS THE MEAN FOR GROUP 2? 231.36
WHAT IS THE NUMBER OF SCORES IN GROUP 2? 246
WHAT IS THE STANDARD DEVIATION FOR GROUP 2? 28.32
PLEASE INPUT YOUR HEADING NEXT
THE T TEST SCORE IS  4.41122

GROUP 1 IS LARGER THAN GROUP 2
```

TOTAL SURVEY – SEX (♀ VS ♂)

```
Ready
```

NOTE: ALL t-TESTS CONFIRMED THAT THE DIFFERENCES BETWEEN GROUP 1 (MALES) AND GROUP 2 (FEMALES) WERE WELL BEYOND THE 0.01 LEVEL.

```
RUN(1,10)PERSON
***** PEARSON PRODUCT - MOMENT CORRELATION COEFFICIENT *****

1. ENTER THE NAME OF YOUR DATA FILE? WAT308
2. ENTER THE TWO COLUMN NUMBERS FOR YOUR DATA? 4,5
THE CORRELATION COEFFICIENT = .714
THE NUMBER OF PAIRS IS 579
*** THIS IS *** SIGNIFICANT AT THE .01 LEVEL ***

Ready
```

APPENDIX C

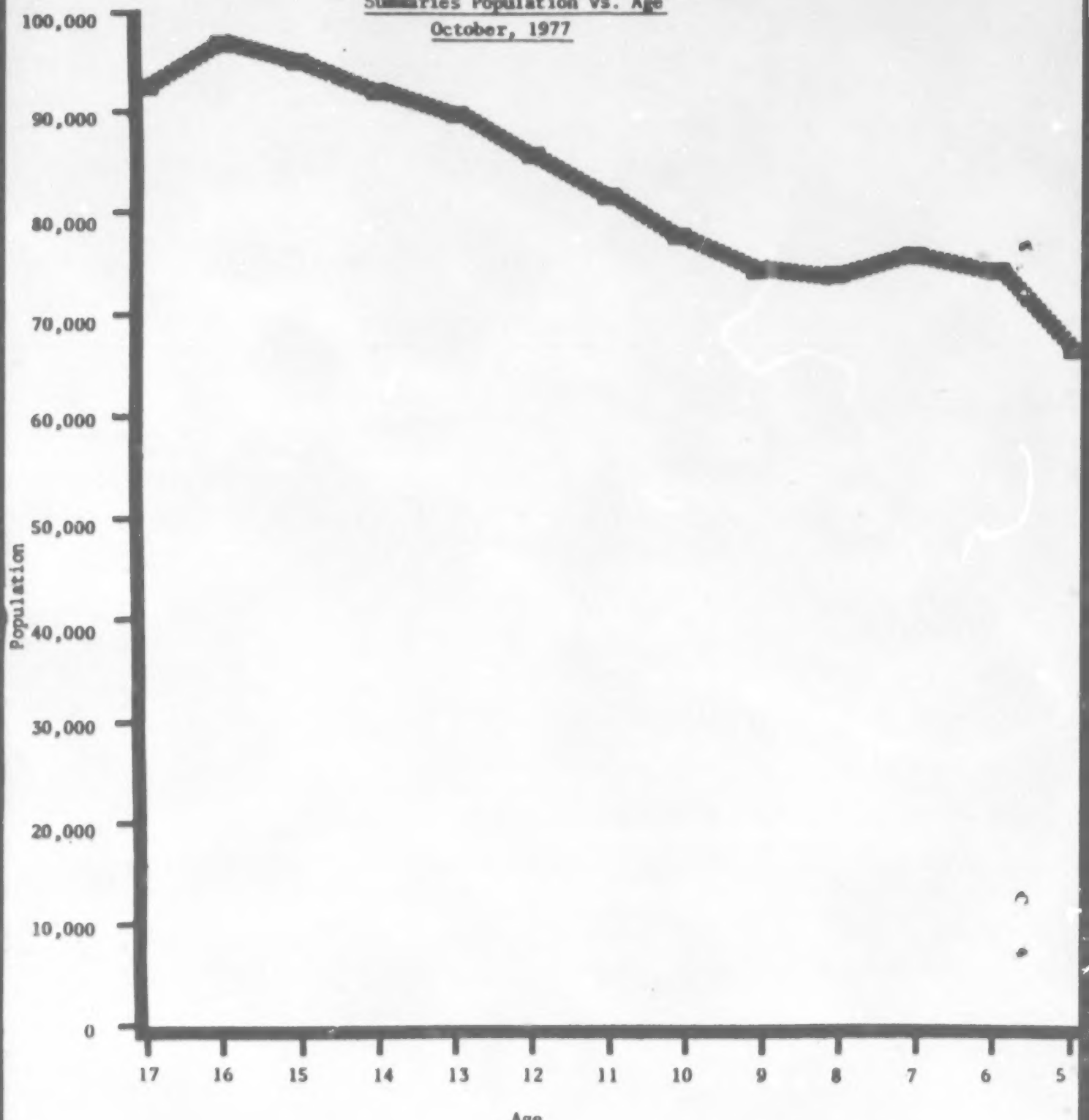
ENROLLMENT STATISTICS, STATE OF WISCONSIN

Part One - School Census Data/ School District Summaries, October, 1977

Part Two - Graph of "School Census Data/School District Summaries, October, 1977

	BOYS	GIRLS	TOTAL
UNDER 1 YR	21,314	20,218	41,532
1 YR	25,132	23,388	48,520
2 YRS	28,330	26,378	54,708
3 YRS	28,674	27,082	55,756
TOTAL 0-3	103,450	97,066	200,516
4 YRS	30,319	28,831	59,150
5 YRS	33,831	32,053	65,884
6 YRS	37,522	35,933	73,455
7 YRS	38,943	36,845	75,788
8 YRS	37,457	35,856	73,313
9 YRS	37,825	36,258	74,083
10 YRS	39,636	37,861	77,497
11 YRS	41,863	39,649	81,512
12 YRS	43,681	41,629	85,310
13 YRS	46,078	43,866	89,944
14 YRS	46,852	45,098	91,950
15 YRS	48,432	46,518	94,950
16 YRS	49,206	47,428	96,634
17 YRS	47,350	45,150	92,500
18 YRS	44,709	41,980	86,689
19 YRS	40,049	36,104	76,153
TOTAL 4-19	663,753	631,059	1,294,812
T O T A L	767,203	728,125	1,495,328

School Census Data School District
Summaries Population vs. Age
October, 1977



Data from Appendix C, Part one, just previous.